Lean Startup: A success factor?

A quantitative study of how use of the Lean Startup framework affects the success of Norwegian high-tech startups.

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16.05.2015

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2015

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http://www.duo.uio.no/

Print: Reprosentralen, Universitetet i Oslo

Abstract

Lean Startup is a framework for entrepreneurship that has gained considerable popularity among entrepreneurs, yet the framework has not been thoroughly scrutinized in academic circles. This thesis aims to fill this gap in two ways. First, by comparing Lean Startup to more established models on entrepreneurship in a theoretical perspective. Second, by conducting an empirical study of how Lean Startup influences entrepreneurial success in practice.

In our theoretical review, we found that while Lean Startup has a more specific focus than the other theories reviewed, the guidelines it proposes are also present in older theories. In our opinion, the biggest contribution of Lean Startup is making entrepreneurship theory more accessible to entrepreneurs. The empirical study was conducted using a quantitative research design, and corroborated the findings from the theoretical review: There was no significant correlation between use of Lean Startup and the likelihood of achieving success.

Acknowledgements

We would like to thank our supervisor Nicolai Løvdal for his helpful guidance and insightful advice. Additionally we would like to thank our informants for making time in their busy schedules, our co-students and the entrepreneurs who participated in our pilot tests and inspiring discussions, and the Centre for Entrepreneurship at the University in Oslo for two valuable and educational years on our path toward earning our master's degrees.

This thesis would not have been the same without your help, and we are eternally grateful.

On a personal note, we would like to thank our friends and family for the encouragement and support. Without you, this thesis would not have been possible.

Misi, za dodawanie odwagi, wsparcię i inspirację.

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1 Introduction

1.1 Motivation

Our motivation to write about Lean Startup was based on several factors. Lean Startup is a framework that is frequently mentioned both by entrepreneurs, in Norway and internationally, as well as by employees in established companies working on new products - so called intrapreneurs.

One illustration of the popularity and recognition of Lean Startup is that Innovation Norway is arranging workshops (Innovasjon Norge, n.d.) in order to teach their members and aspiring entrepreneurs about Lean Startup. Presumably, Innovation Norway, which is one of the most important institutions for innovation and entrepreneurship in Norway, is doing this because they believe that knowing about the Lean Startup framework is helpful for startups and entrepreneurs. Another indication is a board game currently being developed by a group of Norwegian entrepreneurs, called "Playing Lean" (Rasmussen & Jørgensen, 2015). This game aims to teach entrepreneurs how to apply the Lean Startup framework in practice. Recently a crowd funding campaign was launched to finance the production of the board game, and this campaign cleared their goal of raising 75'000NOK within 10 hours. At the time of writing, almost 250'000NOK has been pledged to the campaign.

Overall, it seems that Lean Startup has become a buzzword among entrepreneurs, both in Norway and abroad. In some cases, the belief in the Lean Startup framework can seem almost cult-like, with die-hard followers seemingly believing that it represents an almost guaranteed path to entrepreneurial success. Perhaps being more skeptical at heart, we were intrigued by Lean Startup, but we wanted to know more. Is Lean Startup as popular as it seems? Moreover, are entrepreneurs that use Lean Startup achieving greater success than those who do not? Unfortunately, Lean Startup has not received a lot of scientific scrutiny so far. That is to say, there seems to be no scientific evidence for the effectiveness of Lean Startup. This gap is what we wish to address in this thesis.

Originally, the term Lean Startup was coined in 2008 in a blog written by Eric Ries (2008a), an entrepreneur turned investor and entrepreneurship consultant. Ries later wrote the book "The Lean Startup, How Constant Innovation Creates Radically Successful Businesses" (Ries,

2011) with the goal of formalizing as well as publicizing the Lean Startup approach. Consequently, the Lean Startup framework did not originate as a scientific theory. Since its release, Ries' book has become an international bestseller, and the concept of Lean Startup has been embraced by entrepreneurs worldwide. However, the selection of scientific literature on the theme of Lean Startup remains limited. Therefore, a logical place to start our thesis is by comparing Lean Startup to more scientifically established theories within the field of entrepreneurship research. We compare Lean Startup to several theories and frameworks on entrepreneurship:

- Sarasvathy's concept of Causation and Effectuation (Sarasvathy, 2001).
- Discovery and Creation-theory (Alvarez & Barney, 2007).
- Bricolage (Baker & Nelson, 2005).
- Technology Ventures (Byers, Dorf, & Nelson, 2011).
- Mullins' seven domain model from "The New Business Road Test" (Mullins, 2003).
- Crossing the Chasm (Moore, 1999).
- Steve Blank's model of Customer Development from the book "Four Steps to the Epiphany" (Blank, 2007).

This theoretical review is presented in chapter 2.

However, Lean Startup is not just a theoretical model but a framework with practical implications. As students of innovation and entrepreneurship, we have encountered Lean Startup in studies, internships and jobs over years. These jobs and internships have allowed us to gain personal experience with how development of high tech internet based products is being handled in practice by both established companies and startups. Interestingly, we have noticed that both startups and established companies seem to be interested in employing Lean Startup methodologies in their processes. For some reason, the term seems to have established itself as a de facto standard, on occasion even in companies and industries where Lean Startup does not seem like a good fit. This observation begs the question - are Norwegian high-tech entrepreneurs actually using Lean Startup? Perhaps they are only applying a small subset of the framework?

During our personal experiences with Lean Startup, a couple of things struck us as interesting. First, it seemed clear that there is not a consensus on what exactly Lean Startup is. Rather, Lean Startup seems to be a term that is used to refer to a set of different methodologies, and companies seemed to choose among these methodologies based on what suited them in any given situation. Second, the companies observed were of various sizes and at various stages of market establishment, ranging from companies with decades of history and hundreds of employees, to 4 person startups that still hadn't launched their first product. What they had in common was that all of them had been involved with developing technologically advanced internet based products, and all of them seemed to think that Lean Startup methodologies were the right choice for them.

In order to begin to discover how Lean Startup is actually applied in startup companies today, we conducted a quantitative survey of Norwegian, incubator based technology startup companies. The research design and methodology of this survey are presented in chapter 3, and the results are discussed in chapter 4.

1.2 Research Question

Based on our motivation as described in the previous section, we have chosen the following main research question:

> **What practical advantages does Lean Startup offer that more established theories on entrepreneurship do not?**

One reason why we chose this research question was that we wish to investigate the degree to which Lean Startup is contributing new ideas to the field of entrepreneurship, as opposed to presenting established ideas in a new perspective.

Patz claims that *"Lean Startup rejoices increasing popularity amongst entrepreneurs in Silicon Valley and meanwhile in over 90 countries all over the world"* (Patz, 2013). It's our impression as well, that the Lean Startup framework has reached a high level of both familiarity and popularity among Norwegian entrepreneurs. We have tried to investigate how familiar Norwegian high-tech entrepreneurs are with Lean Startup as well as other entrepreneurial theories and frameworks, and if they actually use this theoretical knowledge in practice.

If the Lean Startup framework is a revolutionary contribution to the field of entrepreneurship, then Norwegian entrepreneurs who use it should be more successful than the ones do not. As part of our analysis, we have tried to determine if there is any correlation between entrepreneurial success and the application of factors that are given more emphasis by Lean Startup than other theories. However, entrepreneurial success is complex, and even if it should turn out to be correlated with Lean Startup, this will certainly not be enough to explain success on its own. In order to break success further down into separate factors, we also wish to explore correlations between success and general knowledge about entrepreneurship theories, and between success and experience as an entrepreneur.

Given these considerations, we have developed our research question into five concrete hypotheses:

- H1: Lean Startup is a conglomeration of previous entrepreneurship theories and frameworks
- H2: Lean Startup is well known among Norwegian high-tech entrepreneurs
- H3: Lean Startup is not significantly correlated with success
- H4: Entrepreneurial experience is positively correlated with success
- H5: Theoretical knowledge about entrepreneurship is positively correlated with success

1.3 Outline

This thesis consists of two main parts. Each part has a separate goal, but the second part builds on the first.

In the first part of the thesis, we try to identify what Lean Startup is offering that previous frameworks and theories of entrepreneurship do not, and that has allowed it to become such a popular framework. As previously mentioned, this was done by doing a thorough literature review where Lean Startup was compared to older, and more established entrepreneurship theories and frameworks. This part also forms the basis for our answer to hypothesis H1.

In the second part, we used the differences identified between the various theories to create a questionnaire. This questionnaire was used to measure use of the different startup frameworks and theories among entrepreneurs, with a focus on Lean Startup in particular. The questionnaire also included questions that were geared at measuring entrepreneurial success and experience. Our analyses of the data obtained from the questionnaire forms the basis for our answers to hypotheses H2 to H5.

By separating the thesis in two parts like this, we are in a position to contribute to entrepreneurship research in two separate areas regarding Lean Startup. The first by identifying the theoretical differences and similarities between Lean Startup and older, more established, entrepreneurship theories, the second by uncovering if use of Lean Startup increases the chance of obtaining success as an entrepreneur.

2 Theoretical Framework

In the following section, we present and discuss the entrepreneurship theories and frameworks that we have chosen to compare to Lean Startup, as well as the Lean Startup framework itself. The theories chosen for this purpose were selected for different reasons:

Effectuation and Causation (Sarasvathy, 2001), Bricolage (Baker & Nelson, 2005) and Creation and Discovery (Alvarez & Barney, 2007) were all chosen because of their important role in entrepreneurship research and their solid scientific foundation. Technology Ventures (Byers et al., 2011) was selected because it contains summaries of many different entrepreneurship theories, and therefore is a great source for searching for guidelines similar to the ones provided in the Lean Startup framework. The New Business Road Test (Mullins, 2003) and Crossing the Chasm (Moore, 1999) were chosen because of their similarities with Lean Startup. Both of these books can be defined as popular-science books because the authors argue for their validity through examples rather than scientific evidence, because they are comparatively easy to read and understand, and because they did not originate as scientific theories but rather as practical guidelines. Finally, the Four Steps to the Epiphany which describes Customer Development (Blank, 2007), was chosen because it is the direct ancestor to Lean Startup. Eric Ries explains that he was inspired and influenced by Blank's work when creating the Lean Startup framework (Ries, 2011). In addition, when comparing The Four Steps to the Epiphany to Lean Startup, the similarities are obvious.

The theories and frameworks are presented in the following order: Effectuation and Causation, Discovery theory and Creation theory, Bricolage, Crossing the Chasm, Technology Ventures, The New Business Road Test (NBRT), The Four Steps to the Epiphany, and finally an overview of the Lean Startup framework as described by Eric Ries.

Our goal in this part of the thesis is to discuss the main differences and similarities - the extremes if you will - between the theories presented. The focus, therefore, is on clearly presenting certain aspects of the theories, rather than giving a thorough overview of the theories as a whole.

2.1 Effectuation vs. Causation

Saras Sarasvathy introduced the terms effectuation and causation in 2001 (Sarasvathy, 2001). Effectuation was born as a result of trying to answer the question; what makes entrepreneurs entrepreneurial?

Sarasvathy introduced effectual reasoning, or effectual logic, as an inverse to the causal logic traditionally taught at business schools. The basic difference between effectuation and causation, according to Sarasvathy, is that effectuation is used when the future is unpredictable, while causation is used when the future is predictable (Sarasvathy, 2001).

In causal reasoning the focus is on achieving a desired goal through a given set of means (see figure 1). Causation invokes search and select tactics and underlies many established management theories. Causal thinkers believe that if they can predict the future, they can control it.

In contrast, when using effectual reasoning, one starts with a set of means, and in the process of deploying these means, goals gradually emerge. Effectual entrepreneurs believe they can create their own future, and therefore do not need to predict it. This simplifies the process of finding a perfect time to start, the optimal opportunity, etc. Effectual entrepreneurs are the masters of their own universe, and consequently do not pay a lot of attention to external factors like dumb luck or timing.

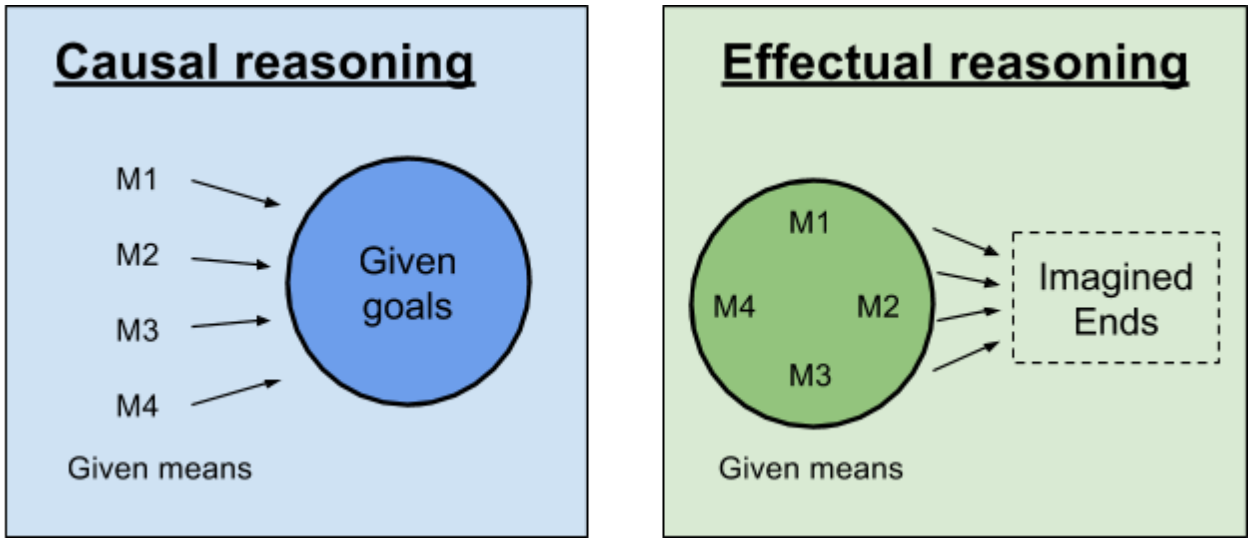


Figure 1: Causal vs. Effectual Reasoning

When describing the difference between effectual and causational logic, Sarasvathy (2001) asks the reader to imagine a chef assigned to cook a dinner. She explains that this task can be organized in two different ways. The first way is to have a customer pick something from a menu in advance. All that the chef needs to do then is to list the needed ingredients, shop for them, and then cook the meal. This is a process of causation. It begins with a given menu and focuses on selecting between effective ways to prepare the meal. The outcome is predictable and the goal is clearly defined.

The second way to organize is for the host to ask the chef to look through the cupboards in his kitchen for possible ingredients and utensils, and then cook a meal based on what she finds. Here, the chef has to imagine possible menus based on the given ingredients and utensils, select the menu, and then prepare the meal. This is the process of effectuation. It begins with given ingredients and utensils and focuses on preparing one of many possible meals with them. The outcome is unpredictable and the goal undefined. Only the means - or the ingredients - are predictable and well known.

According to Sarasvathy (2001), effectuation has five core principles:

1. Bird in hand principle; an entrepreneur using effectuation is starting with whatever resources she has at hand, and without a given goal.

2. Affordable loss principle; an entrepreneur using effectuation does not focus on potential profits, but on the potential losses - and how to minimize these.

3. Form partnerships; effectual entrepreneurs cooperate with parties they can trust, instead of spending time analyzing competitors. These parties can help limit potential losses, for example by giving pre-commitments.

4. The Lemonade Principle; effectual entrepreneurs look at how to avoid contingencies. Surprises are not necessarily seen as something bad, but as opportunities to find new markets and opportunities. “When life gives you lemons...”

5. The Pilot-in-the-plane; the four previous principles put together. The future cannot be predicted, but entrepreneurs can control some of the factors that determine how the future will turn out.

Neither causation nor effectuation is a prescriptive theory or framework of entrepreneurship that is easily pitted against other theories. Instead, they are academic theories that describe and document the reasoning behind entrepreneurial action. According to the Society for Effectual Action (Society for Effectual Action, n.d.), effectuation research has contributed two major factors to the world of entrepreneurship research: First, effectuation is both a theory that can help explain historical performance, and a method that can be applied to future entrepreneurial ventures. By applying this method, the authors claim that entrepreneurs can "fail more effectively", use fewer resources, and gain experience more quickly. Secondly, the authors claim that effectuation is part of an "entrepreneurial method", similar to the scientific method, that can be applied to entrepreneurial ventures. However, the scope of effectuation as a set of guidelines is limited to reasoning about resources and goals. Compared to Lean Startup for example, it does not provide many concrete guidelines.

2.2 Discovery theory and Creation theory

> *"Do entrepreneurial opportunities exist, independent of the perceptions of entrepreneurs, just waiting to be discovered? Or, are these opportunities created by the actions of entrepreneurs?" (Alvarez & Barney, 2007)*

This quote sums up the difference between discovery theory and creation theory, two theories that address the theoretical origins of entrepreneurial opportunities. In the following sections, these theories are presented in more detail.

2.2.1 Discovery Theory

When George Mallory, a famous English mountaineer, was asked why he wanted to climb Mount Everest, he supposedly answered, *"Because it's there"*. This has become a famous quote, and Alvarez & Barney (2007) use it as an analogy for discovery theory. According to discovery theory, entrepreneurial opportunities are all around us, just waiting to be discovered and exploited:

> *"Just as Mount Everest existed before George Mallory climbed it, that discovery opportunities are yet to be observed does not deny the reality of their existence. However, it is entrepreneurs who bring "agency to opportunity" by exploiting them." (Shane 2003 in Alvarez & Barney, 2007)*

Because of the claim that opportunities are objective and available out there, discovery theory implies that everyone could theoretically exploit these opportunities. However, not everybody is an entrepreneur. Consequently, either discovery theory implies that entrepreneurs who discover opportunities are fundamentally different from others in their ability to see opportunities where non-entrepreneurs do not, or that entrepreneurs are different from non-entrepreneurs because they are willing to exploit opportunities that are available to anyone.

These "significant differences" between entrepreneurs and non-entrepreneurs, are often described in entrepreneurship research as personality traits such as alertness, risk perception or cognitive differences (Alvarez & Barney, 2007). However, these claims that entrepreneurs differ from non-entrepreneurs have been researched thoroughly over the years, and few have managed to find significant backing for this claim (Busenitz & Barney, 1997).

2.2.2 Creation Theory

Creation theory is the theoretical opposite of discovery theory. While discovery theory implies that opportunities are out there, ready to be discovered, creation theory states that opportunities do not exist in an objective fashion. Instead, they are created by the actions of entrepreneurs. Creation theory, unlike discovery theory, has not been formulated as a coherent theory in the literature. Aspects of it has, however, been described by several different researchers going back as far as Schumpeter in 1934 (Alvarez & Barney, 2007).

In discovery theory it has implied that opportunities are out there, you just have to "search" for them, however this concept of "searching" has little meaning in creation theory. Search implies that there are opportunities to discover, opportunities that already exist, much like mountains. In creation theory, entrepreneurs do not believe that there is something to find, and consequently there is no need to search. Instead, according to creation theory, entrepreneurs "act, and observe how consumers and markets respond to their actions" (Alvarez & Barney, 2007).

The major differences between discovery theory and creation theory are summarized in table 1 (Alvarez & Barney, 2007).

	Discovery theory	**Creation theory**
Nature of opportunities	Opportunities exist independently of entrepreneurs	Opportunities are created by entrepreneurs and do not exist independently
Nature of entrepreneurs	Entrepreneurs differ in some important way from non-entrepreneurs	Entrepreneurs may or may not be different from non-entrepreneurs
Nature of decision making context	Risky	Uncertain

Table 1: Discovery theory vs Creation theory

2.3 Bricolage

Most startup companies are restrained by limited resources, both in terms of employees and money. This makes surviving and growing into a successful, self-sustainable firm a challenge that most startups fail. What is the reason why firms with what appears to be very similar resources can end up with very different outcomes? Why are some people able to "create something out of nothing"?

Trying to answer these questions, Baker & Nelson (2005) coined the term entrepreneurial bricolage. They argue that the entrepreneurs that succeed in sparse resource conditions are the ones that are able to get the most out of the resources at their disposal. Using Lévi-Strauss as one of their sources, the authors explain how successful entrepreneurs combine the resources at hand in new ways, resulting in innovative solutions to problems. Entrepreneurs are then able to create something valuable out of resources that were previously worth little or nothing. Bricolage is built upon the belief that being aware of the possibilities, and looking for solutions using available resources, gets one much further than simply accepting one's limitations and insufficiencies. In short, Entrepreneurial bricolage is about using whatever resources one has at hand in order to create value and build or grow a company. The term entrepreneurial bricolage has been discussed increasingly in the literature in the last few years (i.e. Fisher, 2012; Perkmann & Spicer, 2014).

Senyard, Baker, Steffens, & Davidsson (2013) conducted a quantitative study of bricolage. Their research suggests that there are rich ties between bricolage and innovativeness. In addition, the authors found that variations in the degree to which firms engage in bricolage behaviors could provide a broadly applicable explanation of innovativeness in new firms under resource constraints. These findings contrast a bit with the conclusions from previous research papers on bricolage, as prior work has sometimes painted a picture of bricolage that focuses on the compromises it often entails. Yet they are quite interesting, and make bricolage an even better fit in the perspective of this thesis, as we wish to investigate how entrepreneurship theories and frameworks influence entrepreneurial success.

2.4 Crossing the Chasm

Crossing the chasm is not describing an entrepreneurial framework per se; it is more akin to a marketing framework describing how to reach mainstream customers with high-tech products. It is also not a scientifically based model, as the author Geoffrey A. Moore explains himself:

> *"Prior to entering the world of high tech, I was an English professor. One of the things I learned during this more scholarly period of my life was the importance of evidence and the necessity to document its sources. It chagrins me to say, therefore, that there are no documented sources of evidence anywhere in the book that follows. Although I routinely cite numerous examples, I have no studies to back them up, no corroborating witnesses, nothing."* (Moore, 1999)

In spite of this, we have chosen to include this book in our thesis for several reasons. Marketing, in particular when entering a mainstream market, can be a crucial success factor when done right, and a critical pitfall when done wrong. Therefore, it would be a mistake for any startup targeting a mainstream market not to think about this problem. This fact has not been lost on other entrepreneurs either, and Crossing the Chasm is listed among the sources or inspirations for both The Four Steps to the Epiphany (Blank, 2007), Lean Startup (Ries, 2011) and Technology Ventures (Byers et al., 2011), to mention a few.

Since its initial publication in 1991, Crossing the Chasm, has gone from an unverified proposition to an established fact both among entrepreneurs as well as entrepreneurship researchers (see for example Chesbrough, Vanhaverbeke, & West, 2006; Venkatesh, 2000; Venkatesh & Morris, 2000). One could even argue that following the systematic guide laid out in Crossing the Chasm is an entrepreneurship theory by itself.

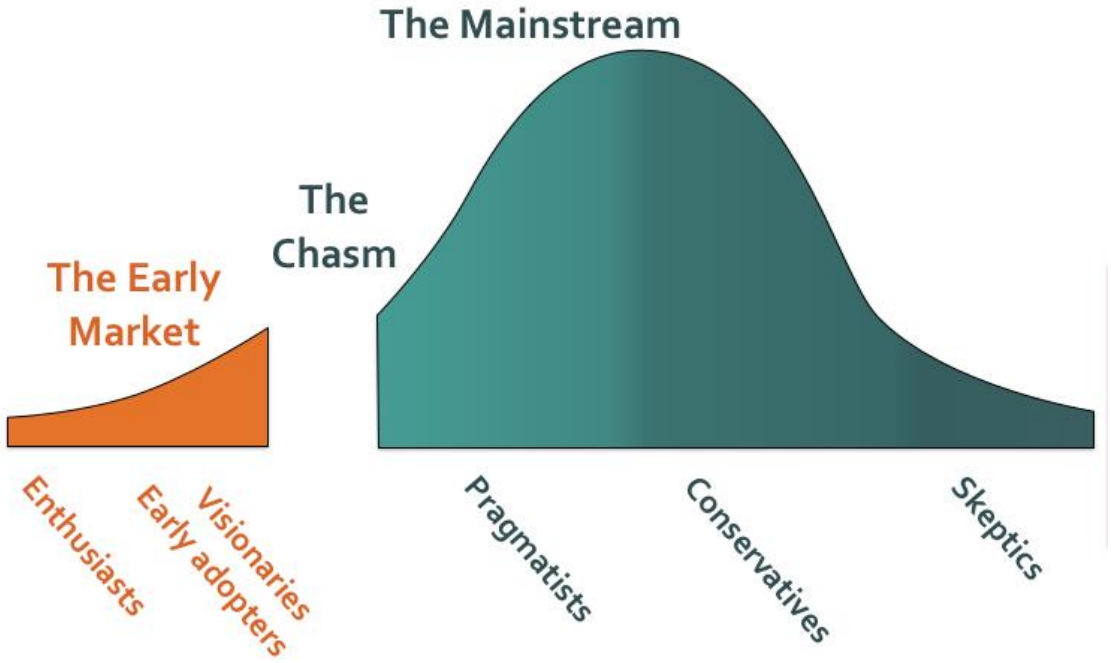


Figure 2: Technology Adoption Lifecycle, including "the Chasm"

In Crossing the Chasm, Moore presents a new variation of the technology adoption life cycle (figure 2) previously described by Everett M. Rogers et al. (1962), to explain how customers adopt a disruptive innovation high-tech product. What he adds to the old model is a crack between each different customer segment, and especially between the visionaries (early adopters) and the pragmatists (early mainstream). This is what is referred to as "the chasm". According to Moore, there is a lot of value in the traditional model, but:

> *"It has the basic flaw of implying a smooth and continuous progression across segments over the life of a product, whereas experience teaches just the opposite"* (Moore, 1999)

Moore advocates that because of different personality traits and expectations of a high-tech product, selling to a mainstream market is something completely different from selling to early adopters and enthusiasts. Furthermore, since the mainstream represents two thirds of the market, according to Moore, crossing this chasm successfully can mean the difference between life and death for a company.

Moore presents concrete guidelines for startups to successfully cross the chasm and reach the mainstream market. Technology-enthusiasts and visionaries are genuinely interested in new

technology and gadgets, and pleased with being able to be "the first kid on the block" with a new product or the potential future advantages the new product may have. The pragmatists' goal, however, is "to make a percentage improvement - incremental, measurable, predictable progress" (Moore, 1999). If the pragmatists are installing a new product, they want to know how other people have feared with it. While enthusiasts and visionaries look for improvements, the pragmatists are more concerned with minimizing risk.

Moore explains that because mainstream customers only buy from market leaders, to be able to cross the chasm it is vital to choose a niche market to attack. Only then will you be able to dominate and become a market leader. When you have achieved success in your chosen niche market, you may move on to the next niche and become the market leader there as well.

Focusing on a niche market will play to your advantage because of the following three reasons: First, because competition is lower, and you focus your resources on a limited area, it will generally give you much better value for your money. Second, word of mouth is the most used reference when it comes to mainstream customers' acquisition of high-tech products. Focusing on a niche market will ensure that word of mouth spreads within your target market "as pragmatists communicate along industry lines or through professional associations" (Moore, 1999). Third, pragmatists only buy from market leaders, as "whole products" develop around market leaders. As a startup, you are far from a market leader. By attacking the mainstream market as a whole, this is unlikely to change. However, if you successfully attack and conquer a niche market, you are by definition the market leader in that niche.

Before attacking your chosen niche market you should "assemble the invasion force", as Moore puts it. Pragmatists strive to buy "whole products". Most likely, you will need partners or allies in order to provide these. Decide what parts of the whole product you wish to deliver, and what you will need partners or allies to provide - then get these partners and allies on board.

Because mainstream customers never buy until they have something, or someone, to compare your product to, you need to "define the battle": *"[...] the pragmatists are loath to buy until they can compare. Competition, therefore, becomes a fundamental condition for purchase."* (Moore, 1999).

Therefore, you need to identify one, or several, competitors to whom the pragmatists can compare you. You can then use this competitor to position yourself in a way that highlights your whole product's actual advantages. Moore then sums up by saying that if you try the exercise of choosing your competition, and find no clear market alternative, this is a warning sign. Most likely, it means that you are not yet ready to cross the chasm.

2.5 Technology Ventures

Technology Ventures: From Idea to Enterprise by Byers, Dorf and Nelson presents a comprehensive compilation of theories on entrepreneurship as well as business management. The book covers all major aspects of both starting and running a business with, as the title suggests, a clear focus on ventures that involve the pursuit of "high-potential, technology-intensive commercial opportunities" (Byers et al., 2011). As our focus in this thesis is on technology startup companies, chapter 1 to 3 of the book is considered the most relevant.

There are numerous books written that are similar to technology ventures. Consequently, this subchapter could very well have been written about other entrepreneurship books. Primarily we chose to use Technology Ventures over other alternatives for two reasons. First, Technology Ventures provides a thorough overview of central entrepreneurship theories on par with what is available in any other book, and secondly because we were familiar with this book from before. Other books may have been just as good, but since we could not include them all the choice fell on Technology Ventures.

The authors of Technology Ventures claims that entrepreneurs differ from non-entrepreneurs. They attempt to define the characteristics of an entrepreneur, as well as the nature of entrepreneurship. They point out that the ability to identify attractive opportunities is an important skill for entrepreneurs. They also advocate the importance of entrepreneurs possessing personality traits such as imagination, creativity, vision and leadership. Additionally, the authors focus on opportunity recognition, and discuss several models for opportunity evaluation. The model that is discussed in most detail is the 7-domain model from the book The New Business Road Test (Mullins, 2003), which is described separately in chapter 2.6.

The authors of Technology Ventures suggest that the best way to identify a good opportunity is to test it in the marketplace, which in turn can "lead to a refinement of the opportunity" (Byers et al., 2011). They refer to this cyclical approach as "act, review, fix", as proposed by Tom Peters and Robert Waterman (1984).

Another topic that is brought up in Technology Ventures is what the authors call the "theory of the business". This theory is a comprehensive view of how the company views itself. It includes the vision of the entrepreneurs, the goals, products and customers of the company,

and the specific value that the company aims to provide to its customers. It also includes strategic components, such as the business model the company will follow, and how the company aims to gain an advantage over its competitors.

2.6 The New Business Road Test

John Mullins' seven domain model, described in the book The New Business Road Test (hereafter referred to as NBRT), consists of seven domains that entrepreneurs are encouraged to go through as a test to prevent spending valuable time writing up a fancy business plan for a product that no one wants in a market that it's impossible to enter. The model addresses micro and macro level attractiveness of both the industry and the market, sustainable advantages of the company, the quality and motivation of the team, its ability to execute on "critical success factors" (CSFs), and its connectedness across the value chain. The components of the model are illustrated in figure 3. Mullins recommends starting in the lower left quadrant (micro-market) and working your way clockwise around the four squares before starting at the circle addressing your team's qualities and challenges.

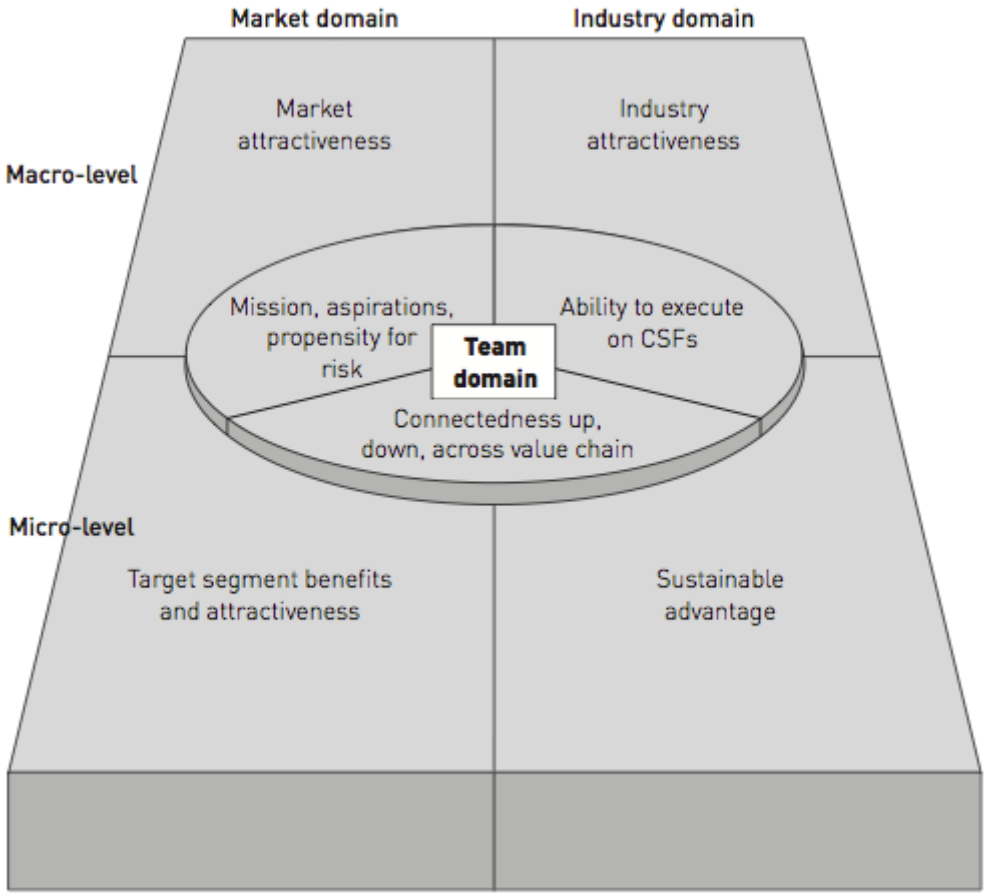


Figure 3: Mullins' seven-domain model, from The New Business Road Test

While NBRT is an effective way of evaluating your idea's chance of survival, Mullins' model is not very scientific. The book provides many examples and histories of highly successful entrepreneurs, such as Bill Bowerman and Phil Knight at Nike and Howard Schultz at Starbucks, and how they utilized advantages in one or several domains. By doing this Mullins present convincing arguments for why one should use his framework, even though the claims are not backed by scientific evidence.

Mullins recommends that entrepreneurs evaluate their score in each of the domains on a scale from 1-10, and then identify domains where your opportunity scored low (e.g. below 6) and high (e.g. above 8). You then have to evaluate which domains are the most critical to your opportunity.

In some cases, strong scores in one or several domains might mitigate a low score in other domains. In other cases, the result of the evaluation will be the conclusion that you do not have the required resources in certain domains. This is a perfect opportunity to make adjustments and putting some effort into developing the opportunity further because, as Mullins says, *"you don't want to go to investors - nor to market - with a crucial flaw in your opportunity"* (Mullins, 2003).

2.7 The Four Steps to the Epiphany

When Eric Ries coined the term Lean Startup, one of his major influences was the book The Four Steps to the Epiphany by Steve Blank (Blank, 2007; Ries, 2011). In this book, Blank describes what he calls the Customer Development approach to entrepreneurship. The book is written as a collection of lecture notes, thoughts and examples from Blank's experiences as entrepreneur and lecturer. Consequently, it can be challenging to read the book and to comprehend the guidelines that Blank suggests in it.

The basic premise of the Four Steps to the Epiphany is that traditionally, startup companies were seen as "small versions of traditional companies", and the skills needed to manage these small companies were essentially the same as those needed for traditional management. According to Blank, this is not the case, and his Customer Development approach was his attempt at providing a better set of management principles for startup companies.

Essentially the process of building a startup, according to Blank, starts by validating your value proposition. That is, before you start building a sales organization, customer support, PR department, and so on, you first have to make sure that you are making something that people want and that you can successfully sell this product to a specific customer segment. Only after this has been confirmed do you start building a company in the traditional sense. The framework can be broken down into five key points:

1. **Get out of the building**
   The main reason for failure in startups, according to Steve Blank, is not technology issues, but lack of customers. Get out, talk to your customers, and learn what they want. Do not spend time developing a product that no one wants - get out of the building, and start finding out whether your dream is a vision or a delusion. As Blank puts it: *"In a startup no facts exist inside the building, only opinions"*. Minimize the risk of total failure by checking your theories against reality.

2. **Market types**
   According to Blank, there are three types of markets; the first is a new market that needs to be created. Second is an already existing market with potentially fierce

competition. Third is a re-segmentation of an existing market, or a niche market. Your tactics need to match the kind of market in which you are operating.

3. **Finding a market for the product as specified**
   Even though you should get customers opinion and update your product accordingly, you should not listen to whomever and abandon your company's vision every day. You cannot please everyone. Instead, you need to look for a market that suits your vision and product, and then adjust your product according to their feedback.

4. **Phases of product & company growth**
   The Four Steps to the Epiphany claims that any startup should go through four steps on their journey toward becoming an established company. Customer Discovery - when you are trying to figure out if there are any customers who might want your product. Customer Validation - when you make your first revenue by selling your early product. Customer Creation - when you launch your product to the public. Finally, Company Building - when you gear up to follow the guidelines from Crossing the Chasm (Moore, 1999).

5. **Learning and iterating vs. linear execution:**
   When a company is about to start up they often don't know a lot about their market and customers, and their plan is based on guesses and assumptions. With the "big business" model, startups would have launched at this stage - leaving their future more or less up to chance. Only if this launch lead to a failure, and often an expensive one, would they go back and try a different approach. With the customer development model suggested by Blank, startups are allowed to fail at an earlier stage, which enables them to learn and to tailor their product to the customer as early as possible. This minimizes losses and increases the chance of success.

Eric Ries summarized The Four Steps to the Epiphany by concluding that all startup companies need to spend time learning and iterating before a launch (Ries, 2008b). It is important for them to spend this time talking with potential customers, enabling them to learn without going through expensive or embarrassing failures. The Four Steps to the Epiphany provides a framework that makes sure this period does not last forever, and makes sure you know when it's time to actually launch your product.

2.8 Lean Startup

Lean methodologies exist in many different flavors and variations. A review of scholarly articles on lean production, which is the prototypical domain for lean management, found no consensus among researchers on how exactly lean production should be defined (Pettersen, 2009).

However, all lean methodologies share certain core principles; such as specifying value from the standpoint of end customers, identifying what steps in your value chain that are generating value and eliminate the rest, not keeping goods in stock - thereby eliminating waste of time and resources (Lean Enterprise Institute, n.d.).

Lean management first emerged within production of physical goods, more specifically by Toyota in the automotive industry. A collaborative study funded by several automotive production companies between 1985 and 1990 found that car-manufacturing plants in Japan were twice as effective as those in the West (Lewis, 2000). According to Lewis, the consequence of this study was the emergence of a lean management movement. Eventually, this movement developed the belief that lean management principles could be applied not just to the production of physical goods, but to pretty much every industry in every country across the globe.

The Lean Startup framework is a recent addition to the collection of lean management principles. Additionally, unlike other branches of lean management, Lean Startup methodologies have not been studied extensively by researchers. On the contrary, Lean Startup can be seen as more of a "popular science phenomenon" (Patz, 2013), than a scientific theory.

The term Lean Startup was initially popularized by Eric Ries in 2011, in his book titled "The Lean Startup: How Constant Innovation Creates Radically Successful Businesses". However, the approach advocated by Ries in his book to a considerable extent built upon the teachings of Steve Blank in what he calls the Customer Development approach (Blank, 2007; Ries, 2011). See also chapter 2.7. Both Lean Startup and Customer Development emphasize customer involvement and iterative product development. Like the Customer Development methodology, Lean Startup is aimed at startups that are essentially building products without knowing who the customers will be or even exactly what the final product will be.

The focus of the customer development approach advocated by Steve Blank, is the process of actively gathering feedback from potential customers as early as possible in the life of a new venture (Blank, 2007). Without the knowledge of who the actual end customers will be, this essentially means that informants must be sought out based on your best guess of what the customer segment will be. Blank also advocates producing a "Minimum Viable Product", a version of the product that contains only the absolutely necessary features, in order to gather customer feedback. These guidelines are adopted by Ries in his Lean Startup framework (Ries, 2011).

Ries gives credit to Blank in his book, stating that Blank's work and lectures was what made him think about Lean Startup to begin with. However, the Lean Startup framework is clearly inspired by other previous theories such as Alexander Osterwalder's business model canvas (Osterwalder & Pigneur, 2010), Design Thinking (Buchanan, 1992), Kent Beck's Extreme programming (Beck & Andres, 2004), as well as lean management and lean manufacturing (Pettersen, 2009). The figure below illustrates how Lean Startup developed from previous entrepreneurship and management theories.

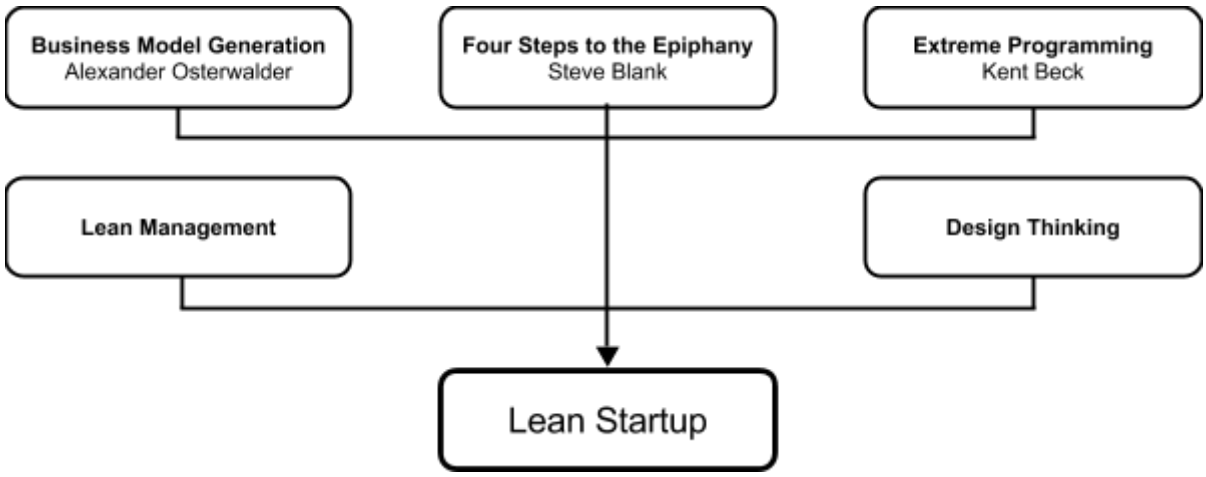


Figure 4: Lean Startup "inspiration timeline"

An important aspect of the customer development process is that from time to time it will turn out that a product is being developed with incorrect assumptions. For example, perhaps you are developing a product that attempts solve a problem that is not actually a big enough

problem for people to care about, or developing a feature for your software that no one really wants. This is where the concept of the pivot comes into play (Blank, 2007; Ries, 2011). By discovering as early as possible that you are on the wrong path, you can change direction before you run out of resources.

Eric Ries builds upon this approach by advocating that the collection of customer feedback should be made as efficient as possible, preferably automated, that the product should be developed iteratively and continuously, and that each iteration should be geared at testing a specific hypothesis about the product and the customers. Ries refers to this as the "build, measure, learn" cycle (Ries, 2011). See figure 5 below.

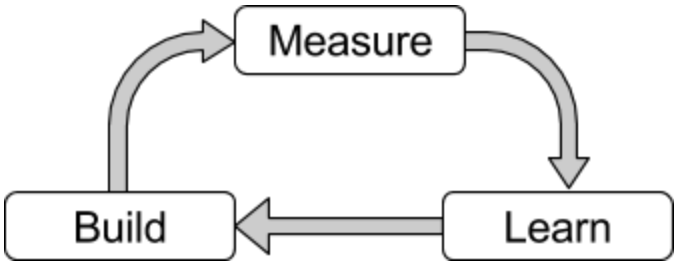


Figure 5: The build, measure, learn cycle

Additionally, Ries advocates that new versions of the product should be released as quickly and as often as possible, even if the product is far from fully developed. The idea is that by conducting experiments on the customers, it is possible to minimize the time required to learn what the customers want and do not want. This approach lends itself well to software products, where both product launch and gathering of customer feedback can be done cheaply and efficiently.

2.9 Comparison of the models

The different entrepreneurship frameworks and theories and their similarities and differences compared to Lean Startup are discussed in the following paragraphs. Additionally a summary is presented in table 2, at the end of this section.

Effectuation and causation both have strict guidelines, and are easy to separate in theory. In causation, you start out with a given goal, and a set of means to achieve the goal. With effectuation, you do not start out with a given goal, but instead combine your means in order to create something valuable. Lean Startup could be considered a mix between the two; you have a goal to create something valuable and profitable, but you do not know how to get there - and the product is undefined.

Discovery theory and the theories presented from Technology Ventures both claim that entrepreneurs are different from non-entrepreneurs in some significant way. Lean Startup do not believe this, and in fact Ries advocates the very opposite: *"Entrepreneurs are everywhere [...]"* (Ries, 2011).

Creation theory implies that you should experiment and learn ("act, and observe how consumers and markets respond to your actions"). Bricolage also implies that experimenting and failing fast should be a priority, but does not actively encourage entrepreneurs to test their ideas on customers. Lean Startup similarly encourages experimentation, but takes it to the next level by explicitly encouraging entrepreneurs to fail as early as possible and continuously develop the product according to feedback. This is not a new idea, but Lean Startup emphasizes it more than the more established theories do.

Technology Ventures presents an "act, review, fix" cycle, which is bound to seem familiar to anyone who has reviewed the "build, measure, learn" cycle proposed in The Lean Startup (Ries, 2011). However, while Ries proposes that this approach should be used to test products with customers, what Byers, Dorf and Nelson is proposing is that the approach should be used to test identified business opportunities with customers, employees and investors. What Byers, Dorf and Nelson propose in Technology Ventures is in fact a similar but less detailed version of NBRT.

Lean Startup and Customer development also have many similarities with NBRT. In fact, just like Technology Ventures, Lean Startup and Customer Development appear to be more

specialized versions of NBRT. While Lean Startup focuses merely on the product, NBRT focuses on many different external and internal factors such as market and industry attractiveness, team quality, and connectedness in the value chain. NBRT is also primarily aimed at testing business ideas before launch, and not at testing products on customers after development has started.

NRBT, Crossing the Chasm, Customer Development and Lean Startup all advocate that you need to adjust your approach according to the customers you try to reach. While this might seem logical with the knowledge we have about entrepreneurship today, this may not always have been the case in the past when startups were treated as smaller versions of big companies, according to so-called "big-company logic" (see chapter 2.7).

Crossing the Chasm is an example that a model can start as something non-scientific, and yet end up as an established "truth" that has been adopted by the scientific community as well. The chasm is now considered a fact, rather than the theoretical model it was when it was introduced by Moore in 1991. Moore's book laid the foundation for a lot of research on how to best introduce a new technology product to the public. Today his framework is frequently used by both startups and big companies worldwide. Is this what is currently happening with the Lean Startup framework?

NBRT and Crossing the Chasm are written in a similar way as Ries' book on Lean Startup. The books are all easy to read, and provide lots of examples, but little scientific data, to argue their case. As a result, when reading these books the guidelines they provide seem so logical and unavoidable that doing things in any other way would be silly. However, finding examples that fit what you already think is a lot easier and more natural than the opposite. This is what is known as confirmation bias (Nickerson, 1998). None of the authors of these books have based their arguments on any form of scientific experiments to test if what they are presenting actually works.

Ries and Blank both seem to be highly influenced by NBRT, Crossing the Chasm, and theories from Technology Ventures. Several of the advices and guidelines suggested by Ries bear striking resemblances to the theories and guidelines laid out in these books. Examples of this are the "act, review, fix - circuit" from Technology Ventures, the advice to rethink or stop working on ideas and products that yields bad results in your tests, the urge to rethink your

business idea if it does not pass the New Business Road Test, and finding a target market that suits your product and adjusting your approach accordingly from Crossing the Chasm.

Steve Blank's Customer Development was perhaps Ries biggest inspiration when writing the book "The Lean Startup". This is clear both because of Ries actually giving Blank credit in his book, but also when reading Blank's book "The Four Steps to the Epiphany", which proposes more or less the same steps as Ries does in Lean Startup. Compared to Ries' book which is quite easy to read and understand, Blank's books are more academic and harder to grasp. Therefore, it seems like what Ries has done is more akin to repackaging Blank's the Four Steps to the Epiphany rather than coming up with a revolutionary new approach of his own.

Model	Similarities with Lean Startup	Differences from Lean Startup
Effectuation and Causation	LS can be seen as a mix between these two. You have a goal, but you do not know how to get there - and the goal might be unclear. Effectuation: The Lemonade Principle; Effectual entrepreneurs look at how to avoid contingencies. Surprises are not necessarily seen as something bad, but as opportunities to find new markets. “When life gives you lemons..” "Effectual logic" can be used as the fuel to create more effective "experiments" by entrepreneurs testing their theories in the real world. Effectuation doesn't merely explain historical methods of performance, effectuation is a method that anyone can learn and use to decrease the risk of starting a venture, "fail" more effectively, use fewer resources, and become "expert" in entrepreneurship more quickly	Implies that Entrepreneurs differ from non-entrepreneurs. An entrepreneur using effectuation does not focus on potential profits, but on the potential losses - and how to minimize these. Not a “How-to” framework for entrepreneurship, but a theory trying to explain why entrepreneurs act as they do.
Creation vs Discovery	In creation theory, entrepreneurs do not search - for there are no mountains to find - they act, and observe how consumers and markets respond to their actions. Creation theory encourages to “act, and observe how consumers and markets respond to their actions”. Lean Startup takes it to the next level by saying so explicitly, but it is not new.	Discovery theory suggests a difference between entrepreneurs and non-entrepreneurs. Academically approved / accepted.

Model	Similarities with Lean Startup	Differences from Lean Startup
Bricolage	Similar to Effectuation, both utilizing whatever resources at hand. Bricolage implies that experimenting and failing fast should be a priority. Lean Startup takes it to the next level by saying so explicitly, but it is not new.	Bricolage is not encouraging testing your idea / product on customers.
Crossing the Chasm	Concrete guidelines. No scientific backing, but a lot of "real life" examples. Need to adjust your approach according to your target customer.	Marketing only. Focus on how to successfully conquer a target market, rather than the product itself. Aimed at disruptive innovation high-tech products.
Technology Ventures	Act, review, fix is very similar to Ries' build, measure, learn. Aims to identify showstoppers before having spent a lot of money. Adjust your approach according to your target customers.	Lots of frameworks described in one book. Implies a difference between entrepreneurs and non-entrepreneurs. While Ries proposes that this approach should be used to test products with customers, Byers, Dorf and Nelson is proposing is that the approach should be used to test identified business opportunities with customers, employees and investors.
NBRT	Concrete guidelines. No scientific backing, but a lot of "real life" examples. Actively approach potential customers. Need to adjust your approach according to your target customer. Aims to identify showstoppers before having spent a lot of money.	More detailed, focus on other factors than the idea itself such as team, market etc. More systematic approach. What to do before writing a business plan. In Lean Startup, a business plan is worth little / nothing when sat in practice because of frequent changes. Pre-launch. Not testing an already launched product on real customers

Model	Similarities with Lean Startup	Differences from Lean Startup
Customer Development	One of LS' precursors, consequently there is many similarities. Need to adjust your approach according to your target customer. Aims to identify showstoppers before having spent a lot of money. Get out of your building and talk to (potential) customers. Focus on consumer based technology products.	More focus on quick iteration and quantitative, actionable measurements. Focus on figuring out what customers "think" they want, by asking them, rather than conducting experiments with minimal viable products. More focus on factors other than the product (market etc.)

Table 2: Comparison of models

2.10 Summary

As can be seen in the table above, the Lean Startup framework has similarities with all of the other theories and frameworks. Some of them have few similarities, while other have surprisingly many. Consequently, the conclusion of the first part of thesis is that the Lean Startup framework is not offering much new compared to older, more established theories of entrepreneurship. The biggest contribution that Lean Startup is offering is an increased focus on the development of the product and on gathering customer feedback. Ries advocates the importance of getting your product out to your target customers, gathering concrete feedback, and updating your product accordingly.

For several reasons, effectuation and causation, Technology Ventures and Customer Development were left out of the questionnaire in the second part of our thesis: Effectuation and causation was left out because they are not prescriptive frameworks for entrepreneurship but theories trying to explain entrepreneurship in general. Since we wish to study people who by definition are already entrepreneurs, these theories do not belong in the study.

Technology Ventures was excluded from the questionnaire and analysis because rather than being a theory or model of entrepreneurship of its own, this book is a review of a plethora of entrepreneurship theories and frameworks. This means that measuring the use of the Technology Ventures book would boil down to measuring the use of the theories and frameworks described in the book, which means the book itself is not interesting in practical terms. Interestingly enough, this was also the main reason why we chose to include this book in the theory chapter. Because the book describes a lot of different theories and frameworks, it was a good place to look for similarities and differences between Lean Startup and other entrepreneurship theories.

Lastly, Blank's Customer Development was left out because it is so similar to the Lean Startup framework that separating the two based on a questionnaire would be next to impossible. Obviously, this is also the reason why it was included in the theory chapter.

3 Methodology

3.1 Research Design

The methodology we have used in the thesis is related to the research question, so allow us repeat it:

> **What practical advantages does Lean Startup offer that more established theories on entrepreneurship do not?**

This research question could have been studied with a qualitative research design, but for several reasons we decided that a quantitative study was the best option.

One inspiration for this thesis was the work of Matthias Patz who in 20013 wrote a master's thesis with the aim of filling part of the research gap regarding Lean Startup. Patz' goal was to contribute to making Lean Startup a more academic and scientifically approved framework:

> *"The aim of this paper is to capture the method of Lean Startup in academic terms. Following it is essential to evaluate if it is only old wine in new bottles or if any extensions can be made to current theories."* (Patz, 2013)

Patz used a qualitative research design, where he conducted interviews that he later analyzed in a phenomenological manner. To complement and further develop his research it made sense for us to use a quantitative research design.

Our research question deals with how the Lean Startup framework differs from previous frameworks and theories of entrepreneurship. This was investigated by identifying similarities and differences between Lean Startup and other entrepreneurship frameworks. In addition, we wished to investigate if Norwegian high-tech entrepreneurs are actually using Lean Startup in their day-to-day work.

The similarities and differences identified in the theoretical part of our thesis were used to develop a questionnaire. This questionnaire was then used to uncover if, and to what degree, high-tech entrepreneurs are using Lean Startup in their everyday work, as well as data regarding the individual entrepreneur and the startup they are working on.

Since our hypotheses and our questionnaire were developed based on existing theory, we've used a deductive approach (Ghauri and Grøhaug, 2005, in Wilson, 2010). We chose to use a correlational, descriptive and quantitative research design to test our hypotheses, because this is the most appropriate research design for investigating relationships across a definite population, such as Norwegian high tech startups (Wilson, 2010). Additionally, we believed that a quantitative study could yield clearer and more useful results than a qualitative study would have.

Out of Patz eight interview subjects, three of them were people who had written, in Patz' words, *"groundbreaking books in the domain of Lean Startup which coined the mindset and understanding of most practitioners"*. The remaining five *"help other people apply Lean Startup principles and are influential leaders within their respective communities"* (Patz, 2013). We believe that choosing interview subjects with a proclaimed relationship to the framework will yield results that are skewed in favor of Lean Startup. The people behind the framework would probably like to see it getting more weight and attention among academics, and consequently they might be biased when describing it.

To prevent this kind of confirmation bias (Nickerson, 1998) in the data used in our thesis, we decided to send our questionnaire to high-tech entrepreneurs in general, instead of high-tech entrepreneurs claiming to use Lean Startup. Additionally, we wanted to avoid priming our informants with Lean Startup, or any other framework for that matter (Herr, Sherman, & Fazio, 1983). Therefore, we designed our questionnaire to focus on the informants' views on general statements before mentioning any particular theory or framework.

The questionnaire was developed iteratively, using a cycle of pilot studies and adjustments based on feedback. In this way, we tried to ensure that we asked precise and relevant questions in a way that our informants would find natural and easy to understand. The questionnaire is described in detail in chapter 3.4.

3.2 Selection

When searching for informants for our study, we chose to look at startups based in incubators that were working on a technical product, preferably aimed at the consumer market. We identified incubators in Norway through Siva (Siva, n.d.) as well as Google searches for incubators. We then went through the list of companies located at each incubator, resulting in a list of 130 startups. All the companies on our list should be a good fit for the Lean Startup framework, as they operate in markets and with products that should enable frequent customer tests to be conducted easily and cheaply.

We chose to exclude companies developing products within slow moving, capital demanding markets such as oil and gas or heavy machinery, since the potential to apply the Lean Startup framework would have been limited and hard to measure without observing them over a longer period. As previously mentioned, the informants were not chosen based on any expressed feelings toward the Lean Startup framework or, for that matter, any other entrepreneurship theory or framework.

We chose to focus on firms sitting in incubators, as this is perhaps the easiest way to identify companies that define themselves as startups. Coming up with a clear and unambiguous definition of what exactly constitutes a startup is not straightforward, so in this way we circumvent the problem of making a definition of our own. Another advantage is that these companies are often easier to reach than companies sitting in private offices are, as the incubators in some cases can help us obtain contact information for the startups.

Even though restricting our sample to incubator firms restricts diversity and biases the data in our sample, we would argue that our final dataset consisting of 47 out of the 130 companies we identified should be adequate to yield results that can be generalized to high tech startups in Norway in general. Our sample also included data from entrepreneurs located in incubators all over Norway, which should further increase the quality of our sample.

Wilson (2010) stated that *"a minimum sample size of 30 can be used for statistical reasoning to be valid"*. This means that our sample size is adequate for us to be able run basic SPSS analyses such as correlation, and produce statistically valid results.

3.3 Data collection

The questionnaire data was collected by first contacting each of the incubators by e-mail asking them to help us, either by contacting the startup companies we had identified in their incubator on our behalf, or by providing us with their contact information. This yielded results ranging from no answer at all, to them actively encouraging the identified startups to answer. The last one proved to the most efficient when it came to recruiting informants, although we got comparable response rates from some incubators that did not help us as much as well.

In the cases where we received no response to our initial email, we were forced to find the companies' contact information ourselves and contacting them directly. One challenge with this approach was that the only available contact information in many cases was limited to general support e-mails or similar. These kinds of emails led to some informants, but personal contact information was considerably more effective.

The companies who did not answer the questionnaire were sent reminders within a week, kindly reminding them to participate. The ones who did not answer the second time either were sent another reminder two days later. For each of these rounds, we got approximately the same response rate. Altogether, this resulted in 123 unique visits and 47 valid responses.

We were only able to get hold of contact information for 90 of the 130 identified companies. Several of the companies we were unable to find seemed to be in such an early phase that they had no place to contact other than their incubator. This means that the actual size of our sample was 90 potential respondents, which in turn means that we got a response rate of 52.2%, with which we are quite pleased. Unfortunately, it also means that we probably were not able to recruit a proportional amount of informants from very early stage startups. A consequence of this is that it may not be possible to generalize the results of our analysis to startups in a very early stage.

One incubator helped us by posting our questionnaire on their internal Facebook page. This did not turn out to be a very effective way of recruiting informants. It could however, be one explanation for why we have more visits than companies contacted (123 visits compared to 90 companies contacted). Other reasons for this discrepancy could be that we in some cases were only able to find general contact addresses for companies so that our emails may have been received by multiple people in one company, or that the same people visited the survey from

multiple devices and were counted more than once. This discrepancy however did not cause any issues with our data, since all our informants provided the name of the company they answered on behalf of in the survey, and we did not receive more than one response from any companies.

As previously mentioned, there is a chance that certain types of entrepreneurs were more likely to respond to our request for informants, which could lead to selection effects in our sample (Fraenkel & Wallen, 2009). Even if most of these are outside of our control, they are, if present, likely to affect our data. For example, it is possible that entrepreneurs who are experienced or successful were more likely to participate than entrepreneurs who are less so. In addition to being outside of our control, these kinds of selection biases can be difficult to uncover. There are ways of dealing with these kinds of issues, such as using stratification in the sampling process (Pedhazur & Schmelkin, 1991). However, this would have been too demanding in terms of the time and resources at our disposal for this thesis. Therefore, we have to accept the possibility that our data has been affected by selection effects. However, we do not have any reason to suspect that selection effects have played a major role in our analysis.

3.4 Questionnaire

The questionnaire used to gather data was created using www.typeform.com and is enclosed in Appendix I. We chose to use Typeform instead of more well-known QuestBack because of the high quality user interface and design in Typeform. Our reasoning for this choice was that we hoped that the better user interface would help increase the response rate. Whether or not this worked in practice is hard to measure, but out of the people who visited our questionnaire nearly 40% completed the survey. Some of the comments we received on the survey also indicates that prioritizing UI and design was a good choice:

> *"Best survey UI I have ever seen!"* - Questionnaire informant, 22.04.15
> *"Good survey!"* - Questionnaire informant, 20.04.15

Because of the lack of scientific data on Lean Startup, we were forced to start more or less from scratch when creating our questionnaire. Consequently, the statements and questions in our questionnaire have not been tested in previous studies or proven effective by other researchers. As a result, it is possible that some of the questions can be misunderstood or misinterpreted by the informants. We did however try to minimize the risk of this with the help of pilot studies.

One weakness with our method is that there is no guarantee that what our informants answered on the survey actually correlates with what they do in practice. We believe it is reasonable to assume that for example if an entrepreneur thinks that it is a good idea to test your product with customers as early as possible, they will also try to do so in practice. However, human beings do not always act rationally, and there may be other factors at play that influence the actions of their companies. For example the amount of influence that the representative of each company that answered our survey has over day-to-day decisions in the company, is outside of our control.

As previously mentioned, we conducted several rounds of pilot tests with both entrepreneurs and specialists on entrepreneurship theories in order to try to ensure that the questions in our survey were clear and unambiguous. The pilot tests lead to some questions being rephrased and some being removed because they were ambiguous or unhelpful. On the final pilot test the feedback indicated that the survey was working well and measuring what we intended.

The questionnaire was designed to maximize the response rate. As some of the feedback received on the first pilot test was that the questionnaire was a bit long, we tried to streamline the questionnaire by focusing more on Lean Startup compared to the other theories. This resulted in some of the theories being represented with fewer questions than Lean Startup (see chapter 3.5). This makes sense, as Lean Startup is the main topic of this thesis, and all of our hypotheses are aimed at Lean Startup.

At the beginning of the questionnaire, our informants were asked to agree to the following informed consent;

> *"As with any research project, it's important that your decision to participate is made with informed consent. In other words, you agree to participate voluntarily, and you know what you're agreeing to:*
>
> - *You agree to participate in this survey.*
> - *You may withdraw from participating at any time, and you don't have to specify any reason.*
> - *We will keep your answers and your identity confidential.*
> - *Once the project is finished, all data you have contributed will be deleted."*

Having informants' agree to these points ensured that we were operating within the normal ethical guidelines of a research project, fulfilling our ethical responsibility to all the stakeholders (Wilson, 2010).

The questionnaire consists of four main sections. In the first section the informants were presented with 29 statements about entrepreneurship and entrepreneurship theories, and asked how much they agree or disagree with each statement. In the second part, the informants were asked how familiar they were with each of the frameworks and theories presented in chapter 2. The third section aimed to obtain information about the startup company that the informants were working on. The last section was regarding personal information such as entrepreneurial experience and education. The sections of the questionnaire and their purpose are presented in more detail in the following sections.

3.4.1 Section 1 - Entrepreneurship statements

The first section was designed to work in the same way as many personality tests in psychology: The informants were presented with 29 statements about entrepreneurship and entrepreneurship theories. Each of these statements represented either one of the entrepreneurial theories or frameworks presented in the theoretical framework, or a contrast between two different theories. The statements in this section were arranged randomly, not by theory, in order to prevent informants recognizing a theory or framework they were familiar with and consequently influencing their subsequent answers. Some of the extreme questions in this section were similar to each other. This was done to ensure that the informants actually meant what they answered, and did not just agree with one particular interpretation (Pedhazur & Schmelkin, 1991). The questions in this section had two goals:

1. To ascertain the basic attitudes and views of the informants on entrepreneurship in general.

2. To determine the degree to which our informants acted in accordance with the various theories and frameworks we have considered.

The informants were asked how much they agree or disagree with each statement on a 7-point Likert scale. A 7-point Likert scale was chosen because it provides sufficient granularity to measure differences between informants, as well as between answers from one informant (Pedhazur & Schmelkin, 1991).

Some of the questions were putting two extremes up against each other, forcing the informants to choose between two theories. For example, question 2L: "Instead of doing market research, you should try to sell your product". Here the part about market research represented NBRT, while trying to sell your product as early as possible represented Lean Startup. The remaining questions in this section represented an extreme of one of the theories, such as question 2F: "A business plan always needs to be changed once you start putting it into action", representing Lean Startup.

3.4.2 Section two - Familiarity with theories

In the second section, the informants were asked how familiar they were with each of the frameworks and theories under consideration. Again the informants answered using a 7-point Likert scale, this time ranging from not familiar at all (1) to very familiar (7).

The questions in this section had two goals:

1. Quantifying how familiar informants think they are with the different frameworks, and how this correlates with their answers in section 1.

2. Determining if the informants are putting the theories they claim to be familiar with into practice.

3.4.3 Section three - Company information

The third part of the survey was aimed at measuring the success of the startup company of each informant. This is a contentious issue, as there is no clear or unambiguous way to define entrepreneurial success, and it is arguably even more difficult, perhaps even impossible, to measure success early on in the life of a startup. We chose to focus on factors such as company age, cash flow, valuation, number of customers, and if they have received any form of funding. The idea behind this section was that a company who has survived for years with a longer lasting positive cash flow is per definition a success. The same can be said about a company who has received funding, and even more so if they have received investments and have gotten a formal valuation. Our definition of success is also discussed in further detail in chapter 3.5.3, which describes our analysis of the questions in this section of the survey. These measurements for success were used to test for correlation between theoretical knowledge, actual use of theories or frameworks, and success as an entrepreneur.

This section aimed to answer the following questions:

1. Is success correlated with familiarity and actual use of entrepreneurial frameworks?

2. Is Lean Startup a good way to go if you wish to achieve success as an entrepreneur?

3. Is success correlated with other factors, such as experience and theoretical knowledge about entrepreneurship?

3.4.4 Section four - Personal information

The last section was regarding personal information such as entrepreneurial experience, level of education, gender, age and so on. This information was used to test if education or practical experience with entrepreneurship were correlated with entrepreneurial success, familiarity with entrepreneurship theories, and so on.

3.5 Data analysis

The data obtained from the questionnaire was analyzed with IBM SPSS, according to the guidelines provided by Andy Field in his book “Discovering statistics using SPSS” (2009). The following subchapters present how each of the four questionnaire sections were analyzed.

3.5.1 Analysis of section 1 - Entrepreneurship statements

When analyzing the results from the first section of the survey (see chapter 3.4 above) each answer was transformed into a score ranging from -3, equal to 1 in the questionnaire, to 3, equal to 7 in the questionnaire. Each of the statements in the first section represented either a positive statement regarding a model, a negative statement regarding a model, or two different theories put up against each other. For each informant, a total score for each model was calculated. Agreeing with a positive statement toward a model, counted positively toward the total score for that model, while agreeing with a negative statement toward a model counted negatively toward the score for that model. Statements putting two theories against each other counted positively toward the score for one model, and negatively toward the score for another model.

For example:

Answering “7 - completely agree” with question 2s: *"The best way to get feedback is to try to sell your product"*, would earn the informant a positive subtotal of 3 toward Lean Startup.

Answering “7 - completely agree” to question 2j: *"Good entrepreneurs are visionaries, and it's important to be able to stick with the plan even if the market hasn't responded yet"*, would earn the informant a negative subtotal of 3 toward Lean Startup.

Answering “7 - completely agree” to question 2l) *"Instead of doing market research, you should try to sell your product"*, would earn the informant a positive subtotal of 3 toward Lean Startup, and negative 3 toward Crossing the Chasm.

To make sure each score was comparable and equally weighted during analysis, each variable was divided by the number of questions it was built upon. We created separate variables for Lean Startup, NBRT, Crossing the Chasm, Creation theory, Discovery theory and Bricolage. The composition of these variables is explained in detail in appendix II.

These variables made it possible for us to give each informant a score for each of the theories. In this way, we operationalized use of a particular framework or theory based on informants' agreement or disagreement with the statements representing the actual framework or theory. This score was then used to check for correlation between success and use of frameworks and theories, etc.

Three of the statements in the first section, namely 2t, 2y and 2ab, did not represent a specific theory or framework. These were used to measure informants' attitudes toward entrepreneurship theory in general, using a separate variable as explained in Appendix II.

3.5.2 Analysis of section two - Familiarity with Theories

Based on the answers from section two, we calculated a score for each of the eight theories (1 to 7), and on all the theories combined (8 to 56). This score was used to determine how familiar the informants were with the entrepreneurship theories and frameworks in question, and to test our hypothesis that Lean Startup is a well-known and popular framework among Norwegian entrepreneurs, as well as correlation between familiarity with theories, actions, and theoretical knowledge of entrepreneurship and success. A high score in this section would indicate that the informant is well educated in entrepreneurship theories and frameworks, whereas a low score would indicate the opposite.

3.5.3 Analysis of section three - Company information

Section three was perhaps the section that posed the biggest challenge when it came to analyzing and weighting of the different questions. Success is a complex thing, and measuring it based on questions in a questionnaire is challenging, to say the least. We chose to measure success based a combined, weighted, success score. This success score was based on simple and readily available measurements such as company age, products launched, cash flow, funding, company valuation, revenue and number of customers. It was important to choose parameters that were easy to answer in a questionnaire.

The success sum was calculated in the following way:

Factor	Points
Company age	Less than 1 year = 0 points 1-2 years = 1 point 2-4 years = 2.5 points 5 years or more = 5 points
Products launched	None = 0 points 1 or more = 1 point
Funding	From professional investors = 5 points From government agencies = 2.5 points
Valuation	Less than 1M NOK = 1 point 1M - 10M NOK = 2.5 points 10M - 100M NOK = 5 points 100M - 500M NOK = 10 points 500M NOK or more = 20 points (the highest valuation actually reported was 10M - 100M NOK)
Revenue last year	100K - 500K NOK = 0.5 point 500K - 2M NOK = 1 point 2M - 5M NOK = 2.5 points 5M - 50M NOK = 5 points More than 50M NOK = 10 points (the highest revenue reported was 5M - 50M NOK)
Number of customers	None: 0 points 1 or more: 2 points

Table 3: Success-Score calculation

We chose to weigh having received funding from professional investors and formal valuation highest, because being able to attract professional investors demands a certain quality of the team, idea and product delivered by the startup. Being highly valued is a measure of success that it is hard to disagree with, since it generally requires convincing professional and unbiased people that your company is doing well.

We also tried a few other variations of this calculation, for example putting more emphasis of valuation, funding or number of products launched and number of customers. However, none of these experiments yielded significantly different results to indicate that changes were necessary.

Our model for success was based on previous definitions of entrepreneurial success, found in several research papers. Markmana and Baron (2003), who had a goal of uncovering why some people are more successful as technological entrepreneurs than others are, operationalized success as launching a new company into the marketplace. *"It is understood that entrepreneurial success takes many forms, but since entrepreneurs often create new companies, we explicitly conceptualize such success in these terms, primarily as success in launching a new company into the marketplace"*.

One issue with this definition is that it depends on another definition, namely, what it means to launch a company into the marketplace. Is registering the company enough, or are you required to have customers first? What if you have customers, but none of them have bought anything from you yet? Robinson and Sexton (1994), used earnings potential as a measure for entrepreneurial success: *"Earnings potential was used as a measure of success. We recognize that success is a subjective experience based on one's expectations and actual outcomes; however, we believe that earnings provided a global indicator of success that is quantifiable relative to the sample used"*.

Echols and Neck (1998) defined success as commercialization of innovations. *"Commercialized innovation is thus, the definition of "success" in this article because it is the outcome intended by corporate entrepreneurial renewal"*. Umoren and Udofot (2014) claimed that: *"Personal wealth however remains the commonest index of measuring entrepreneurial success perhaps, given the popularity of the Forbes list. Others are tangible elements such as organization's growth and sustainability, wealth creation, profitability and turnover"*.

Yet, none of these is a perfect way to measure success. Young companies on the verge of a big breakthrough for example, are likely to be deemed unsuccessful using our model. On the other hand, being on the verge of success is not the same as having success. Separating "slightly successful" companies from "really successful" ones would be a challenge, as the limits we have chosen were not aimed at doing this. In a bigger sample, it could have made sense to separate the successful companies into smaller groups based on the "amount of success" achieved. However, this kind of separation was neither necessary nor beneficial for the operations and sample used in our study. Even if our way of measuring success has its weaknesses, we believe that the factors we have included provide us with sufficient

information to have an objective and sensible measure of whether a company has achieved success.

To test the reliability of our model, we conducted some manual sample tests to check if the companies that were classified as successful in our data, are successful in real life as well. This was done by comparing the calculated "success score" from the data, to data available to us from other sources. For example, we looked at public registry data such as financial and ownership data, internet searches for press coverage of the company, and in some cases, our prior knowledge about the companies. These tests yielded positive results: Companies who got a high success score in our data also turned out to be successful based on data from other sources. We are therefore satisfied that our definition of success is sufficient for our use.

3.5.4 Analysis of section four - Personal information

The last section on personal information was used to test if education and entrepreneurship experience on an individual level is correlated with company level data. We check for correlations between education, scores achieved in the different frameworks, entrepreneurial experience and success.

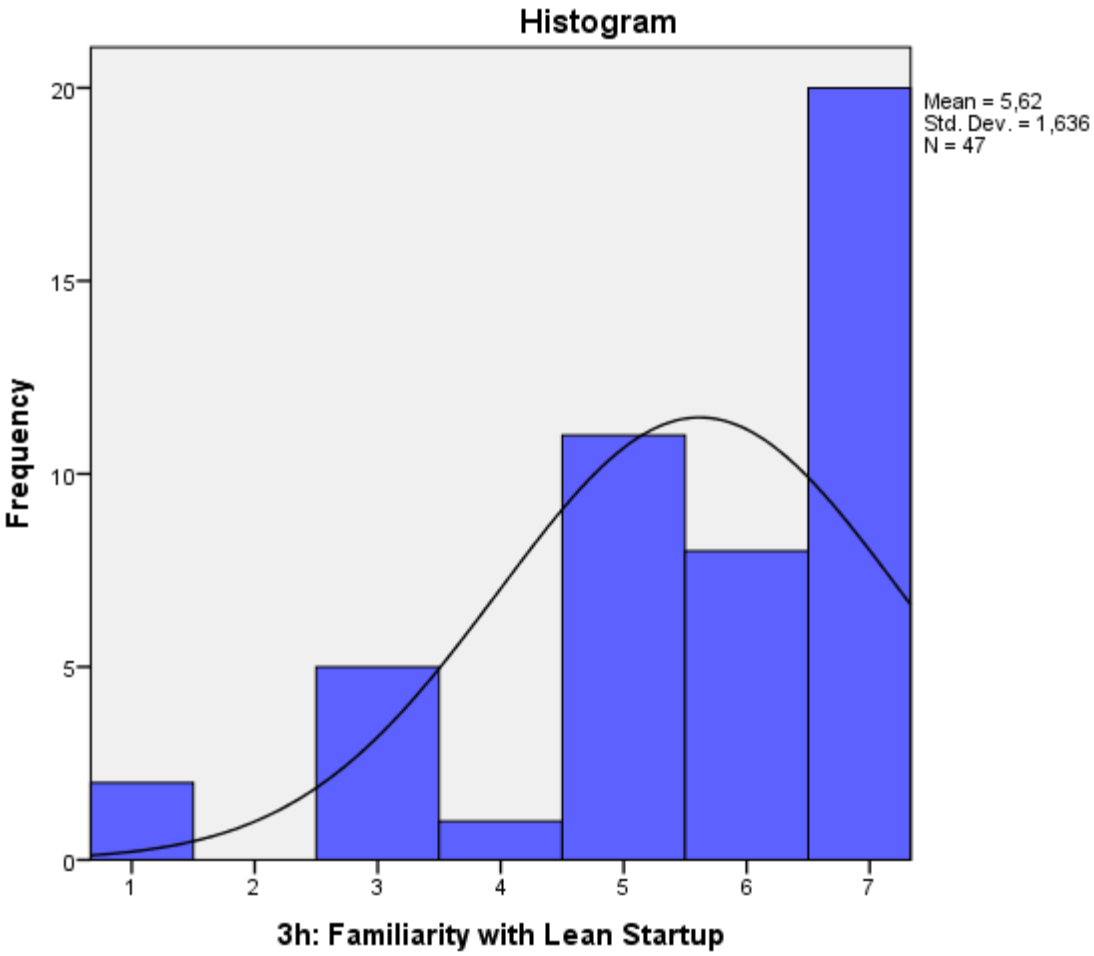
To quantify entrepreneurial experience, the informants' answers on the following questions were transformed and an experience score was computed:

- Q5f: "Number of companies started", 1 point per company up to 5
- Q5g: "Number of years worked as entrepreneur or in a startup", 1 point per year up to 5

This is a simple way to quantify entrepreneurial experience, that is in line with the definition of experience provided by the business dictionary: *"Familiarity with a skill or field of knowledge acquired over months or years of actual practice and which, presumably, has resulted in superior understanding or mastery"* (Businessdictionary, n.d.).

4 Results and Discussion

Our second hypothesis (H2) that Lean Startup is a popular and well-known framework among Norwegian high-tech entrepreneurs is supported by the data collected in our questionnaire. 83% of the informants gave Lean Startup a 5 or higher when asked how familiar they were with the framework. As much as 42.6% of the informants gave it a top score (7). See figure 6 below. This made it by far the most well-known of the eight theories and frameworks the informants were presented with in the questionnaire. This result makes sense, because Lean Startup is a framework that has already received a lot of attention, and that is actively being marketed. In fact, Eric Ries has even registered a trademark for The Lean Startup (United States Patent and Trademark Office, 2009).



3h: Familiarity with Lean Startup

		Frequency	%	Valid %	Cumulative %
Valid	1	2	4,3	4,3	4,3
	3	5	11	10,6	14,9
	4	1	2,1	2,1	17,0
	5	11	23	23,4	40,4
	6	8	17	17,0	57,4
	7	20	43	42,6	100,0
	Total	47	100	100,0	

Figure 6: Familiarity with Lean Startup

Our analyses showed that Lean Startup was also the framework that most of the informants use in practice. As illustrated by figure 7 below, the average score for Lean Startup was as high as 1.13 (on a scale from -3 to 3).

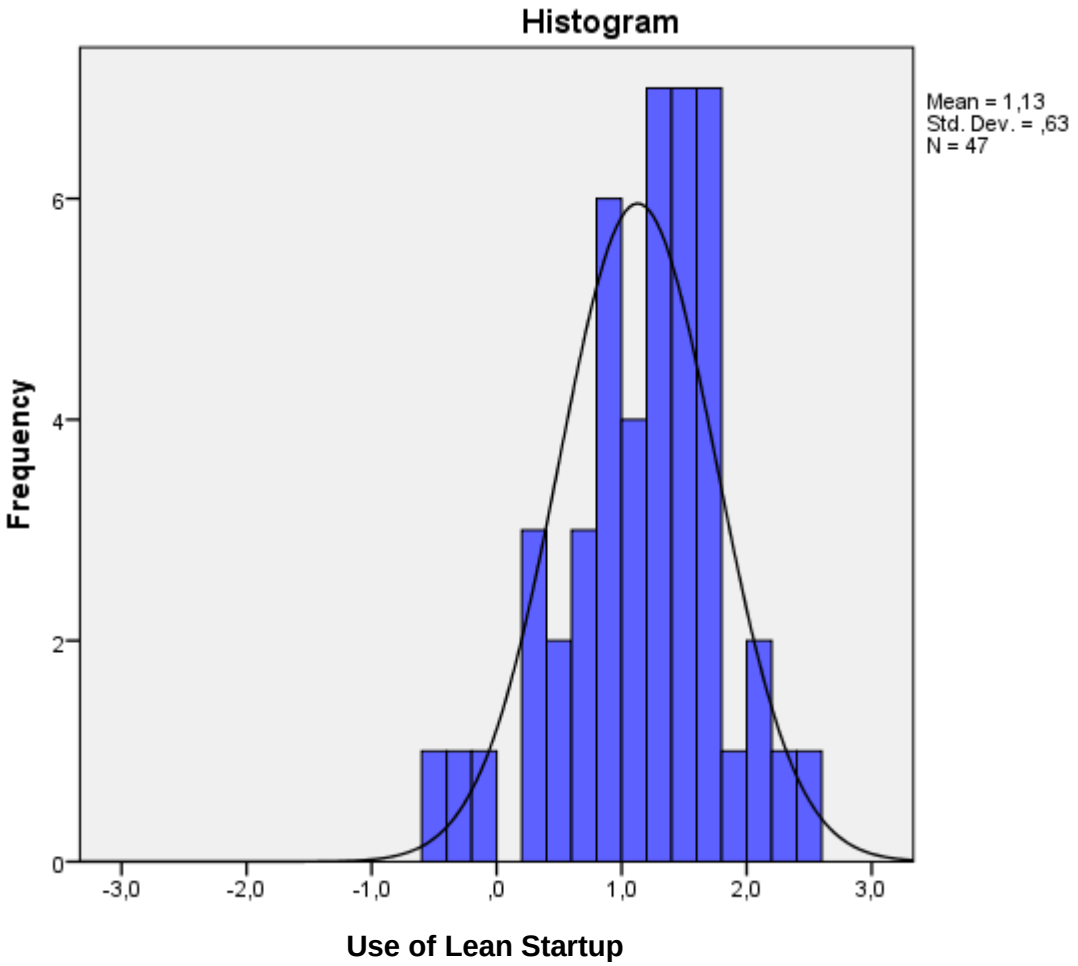


Figure 7: Use of Lean Startup

Interestingly enough, there was no significant correlation (0.093, p=0.535) between a high score on Lean Startup, and proclaimed familiarity with the Lean Startup framework. See figure 8 below.

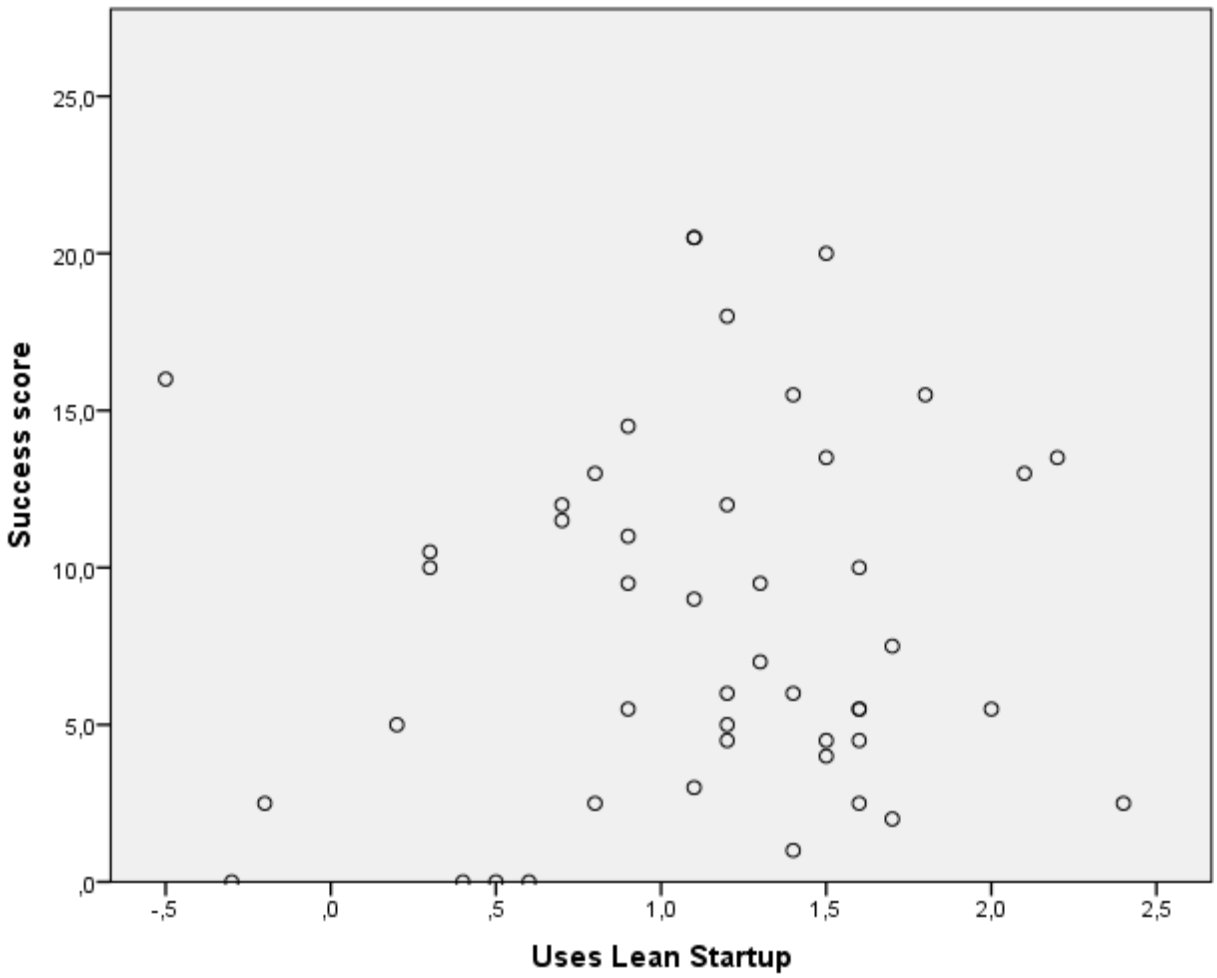
Correlations

		Uses Lean Startup	3h: Familiarity with Lean Startup
Uses Lean Startup	Pearson Correlation	1	,093
	Sig. (2-tailed)		,535
	N	47	47
3h: Familiarity with Lean Startup	Pearson Correlation	,093	1
	Sig. (2-tailed)	,535	
	N	47	47

Figure 8: Uses Lean Startup correlated with Familiarity with Lean Startup

This could indicate that informants that say they are familiar with Lean Startup and believe that they use it in practice, actually don't know what the framework is about - and therefore do not use it in practice. Another possibility is that informants who know about Lean Startup choose not to use it in practice, or only practice some aspects of the framework and not others. Additionally, it could indicate that many of the informants who are not familiar with the Lean Startup framework are using it without being aware of it. If the high level of familiarity with Lean Startup among our informants is representative of Norwegian entrepreneurs at large, it is likely that entrepreneurs will be familiar with aspects of Lean Startup through their interactions with other entrepreneurs, even though they have not learned about Lean Startup themselves. On the other hand, it could also be that entrepreneurs believe that certain practices are part of the Lean Startup framework when in fact they are not. In this way, the entrepreneur could end up mistakenly believing that he or she is using Lean Startup.

Our analyses found no significant correlation (0.091, p=0.542) between a Lean Startup score, implying use of Lean Startup, and success. See figure 9 below. This result indicates that using Lean Startup is not enough to achieve success.



Correlations

		Success score	Uses Lean Startup
Success score	Pearson Correlation	1	,091
	Sig. (2-tailed)		,542
	N	47	47
Uses Lean Startup	Pearson Correlation	,091	1
	Sig. (2-tailed)	,542	
	N	47	47

Figure 9: Correlation between use of Lean Startup and Success

This result may sound strange to some fans of Lean Startup, who might believe that following the Lean Startup framework is almost a guarantee for success. However, it is not very likely that simply using a framework such as Lean Startup is enough to achieve success as an entrepreneur. According to Statistics Norway, only 30% of Norwegian startups are still alive 5 years after founding (Statistics Norway, 2014). If all of these failures could have been avoided simply by using Lean Startup, or another framework for that matter, everyone would be using that framework.

That said our analysis does not give any indication that using Lean Startup has a negative effect on the success of a startup either. On the contrary - we believe that you'll increase your chances of success by combining the best from different frameworks, such as using the New Business Road Test before actually starting to work on your product and then making use of Lean Startup's "build - measure - learn" cycle combined with marketing insights from Crossing the Chasm when you launch the company.

On question 2y in the questionnaire, the informants were asked if they thought practical experience with entrepreneurship was more important than theoretical knowledge about it. As can be seen in figure 10, almost all of the informants thought practical experience was of higher worth than theoretical knowledge.

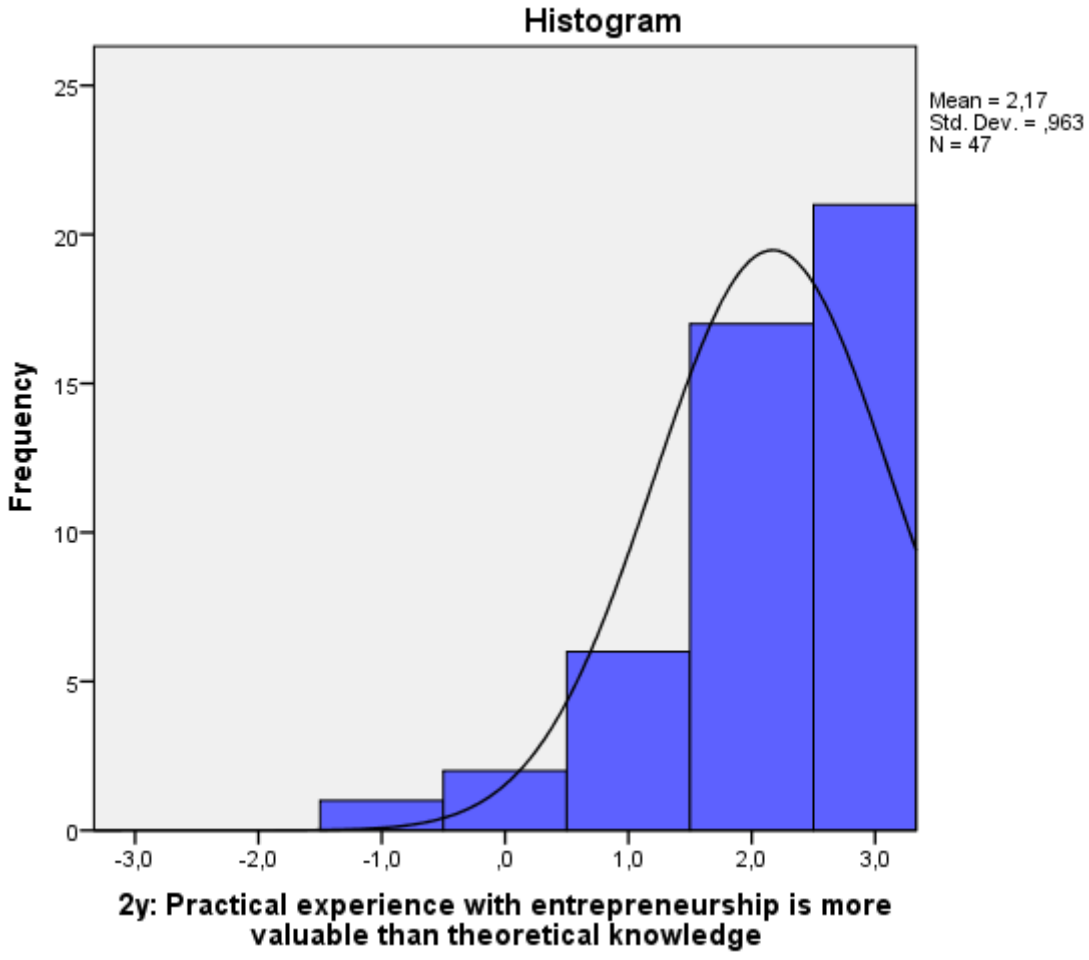
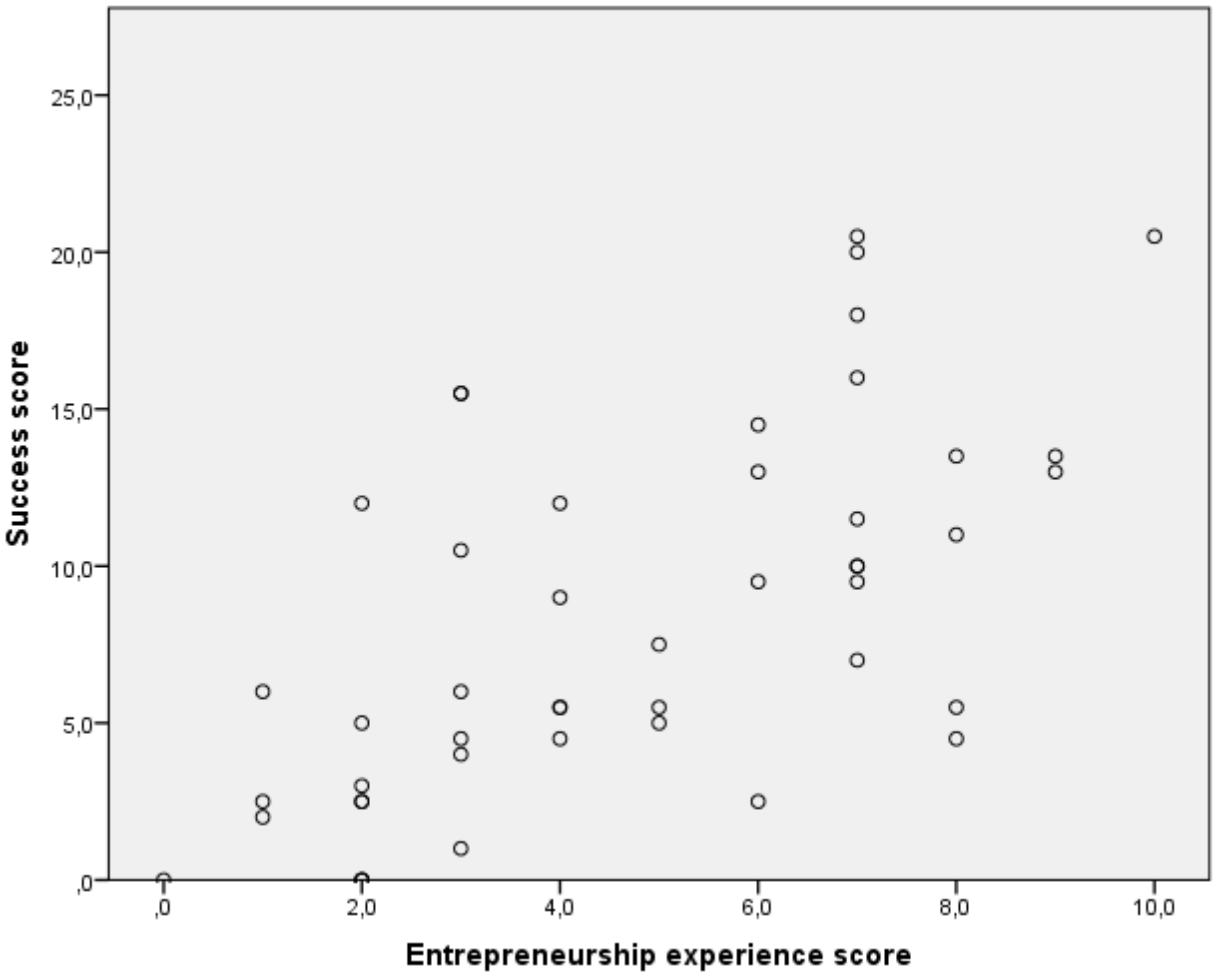


Figure 10: Practical experience vs. theoretical knowledge

In the third section of the questionnaire, the informants were asked about their personal experience with entrepreneurship. Each informant received an experience score based on their answers (see chapter 3.5). Our analyses showed a significant ($p = 0.000 < 0.01$) and strong

(0.634) positive correlation between entrepreneurial experience and success. See also figure 11 below.



Correlations

		Success score	Entrepreneurship experience score
Success score	Pearson Correlation	1	,634**
	Sig. (2-tailed)		,000
	N	47	47
Entrepreneurship experience score	Pearson Correlation	,634**	1
	Sig. (2-tailed)	,000	
	N	47	47

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 11: Correlation between experience and success

Two things stick out in this data: First, that our informants were united in their view on practical experience being more important than theoretical knowledge. This is not a surprising

result in light of our personal conversations with entrepreneurs, but the average being as high as 2.17 was perhaps surprising. Second, it was interesting to see that experience had such a high and significant correlation with success. Even though we did not expect to find clear correlations between Lean Startup or any other theory and success, not finding any correlations in your dataset is not very exciting when doing research. This clear correlation between experience and success is at least an indication that we have managed to measure these things in a way that makes sense.

While experience was found to be highly correlated with success, theoretical knowledge was not. In fact our analyses showed only a very weak (0.017) and highly insignificant (p = 0.909) correlation between success and proclaimed familiarity with the presented entrepreneurship theories and frameworks. See figure 12 below.

Correlations

		Success score	Familiarity with entrepreneurship theories
Success score	Pearson Correlation	1	,017
	Sig. (2-tailed)		,909
	N	47	47
Familiarity with entrepreneurship theories	Pearson Correlation	,017	1
	Sig. (2-tailed)	,909	
	N	47	47

Figure 12: Familiarity with entrepreneurship theories vs. Success

In question 2t, the informants were asked if they thought it was a good idea to spend time learning theoretical approaches to entrepreneurship. As you can see in figure 13 most of the informants answered that they disagreed with this statement (mean = -1).

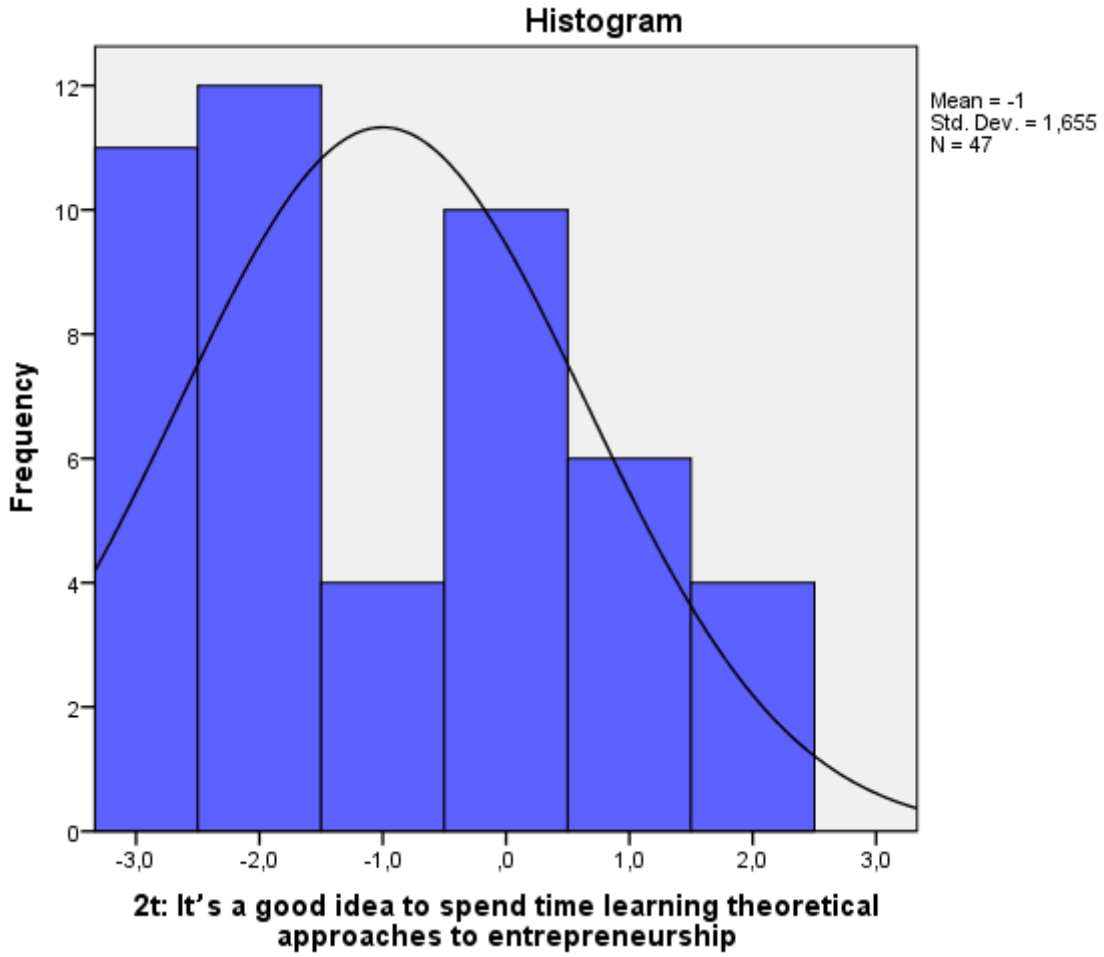


Figure 13: Histogram, question 2t

We found a weak positive (0.142) but insignificant (p=0.340) correlation between agreeing that it is a good idea to spend time learning entrepreneurship theories and proclaimed knowledge to entrepreneurship theories. See figure 14 below.

Correlations

		2t: It's a good idea to spend time learning theoretical approaches to entrepreneurship	Familiarity with entrepreneurship theories
2t: It's a good idea to spend time learning theoretical approaches to entrepreneurship	Pearson Correlation	1	,142
	Sig. (2-tailed)		,340
	N	47	47
Familiarity with entrepreneurship theories	Pearson Correlation	,142	1
	Sig. (2-tailed)	,340	
	N	47	47

Figure 14: Question 2t vs. Familiarity with entrepreneurship theories

We also did not find any significant correlation between attitude toward theoretical entrepreneurship, and proclaimed familiarity to the entrepreneurship frameworks and theories (0.127, p=0.395), see figure 15 below.

Correlations

		Attitude toward theoretical entrepreneurship	Familiarity with entrepreneurship theories
Attitude toward theoretical entrepreneurship	Pearson Correlation	1	,127
	Sig. (2-tailed)		,395
	N	47	47
Familiarity with entrepreneurship theories	Pearson Correlation	,127	1
	Sig. (2-tailed)	,395	
	N	47	47

Figure 15: Attitude toward theory vs. Familiarity with theory

This is an interesting result. It could indicate that Norwegian high-tech entrepreneurs and startup employees, who think theoretical knowledge is important, do not possess the knowledge that they think it is important for themselves to possess. It could also indicate that the theories and frameworks presented in this thesis are not considered important by Norwegian high-tech entrepreneurs, even among the informants who do think that theoretical knowledge is important. If this is the case, it is a bit surprising. We feel that the theories and frameworks considered in this thesis for the most part are basic knowledge for entrepreneurs.

In our opinion, this literature should be among the first things you read if you are interested in learning about entrepreneurship before pursuing an entrepreneurial venture of your own.

5 Conclusion

In this chapter, we summarize the findings from our dataset with regard to the research question and hypotheses we set out to investigate. We then discuss some of the limitations of our study, followed by a discussion of the possible implications of our findings.

5.1 Findings

The goal of our master thesis was to answer the research question:

> **What practical advantages does Lean Startup offer that more established theories on entrepreneurship do not?**

Which we further developed into five hypotheses:

- H1: Lean Startup is a conglomeration of previous entrepreneurship theories and frameworks
- H2: Lean Startup is well known among Norwegian high-tech entrepreneurs
- H3: Lean Startup is not significantly correlated with success
- H4: Entrepreneurial experience is positively correlated with success
- H5: Theoretical knowledge about entrepreneurship is positively correlated with success

Our comparison of entrepreneurship theories and frameworks, which is summarized in chapter 2.10, showed that several of the key components of Lean Startup have been suggested in previous entrepreneurship frameworks and theories. Our conclusion is that Lean Startup does not contain many new ideas on entrepreneurship. This means that hypothesis 1 (H1), *"Lean Startup is a conglomeration of previous entrepreneurship theories and frameworks"* is supported. According to our findings, the biggest contribution that Lean Startup is offering is an increased focus on the development of the product. Ries advocates the importance of getting your product out to your target customers as early as possible, gather concrete feedback, and update your product accordingly.

However, Ries has done a great job of packaging his framework in an accessible and easy to read book for entrepreneurs, which he has commercialized with great success, allowing it to become an international bestseller. Ries has found a way to make entrepreneurship more tangible and understandable for "the common person", not just for researchers and entrepreneurs with above average academic knowledge and interest. This is something he deserves credit for, even if he could have given more credit to the people who created the theories of entrepreneurship that his framework is built upon. He does however credit a few previous frameworks, such as Steve Blank's Customer Development, set forth in the Four Steps to the Epiphany (Blank, 2007). Blank, in turn, gives credit to books such as Crossing the Chasm (Moore, 1999) and several others. Through these books, it is possible to trace back Ries' inspirations for the Lean Startup framework, which illustrates that he, like all of us, is standing on the shoulders of giants.

Lean Startup was by far the most well-known of the eight entrepreneurship theories presented in our questionnaire, as well as the one with the highest score indicating actual use. Therefore, we conclude that our second hypothesis (H2), *"Lean Startup is well known among Norwegian high-tech entrepreneurs"*, is supported.

Additionally we wished to determine if practical use of the Lean Startup framework led to increased chance of entrepreneurial success. As we found no significant correlation between use of Lean Startup and success, we conclude that there is no reason to believe that entrepreneurial success can be achieved simply by using Lean Startup. Consequently, hypothesis 3 (H3), *"Lean Startup is not significantly correlated with success"*, is supported. However, this does not mean that using Lean Startup will negatively influence your entrepreneurial venture. It merely points out that following an entrepreneurship framework or theory is not enough in itself to succeed. Success, and how to achieve it, is too complex for the answer to be as simple as just using the right framework.

Our research found a strong and significant correlation between practical experience with entrepreneurship and entrepreneurial success. Hypothesis 4 (H4) is therefore supported: *"Entrepreneurial experience is positively correlated with success"*. This is a result that makes sense, and that has been found in previous studies as well (for example Stuart & Abetti, 1990).

However, we found no significant correlation between theoretical knowledge about entrepreneurship and success as an entrepreneur. Consequently hypothesis 5 (H5), *"Theoretical knowledge about entrepreneurship is positively correlated with success"*, is not supported. This, along with the strong correlation between experience and success, is an indication that entrepreneurship is something that is best learned by doing rather than contemplating.

5.2 Limitations

Even though Wilson (2010) claimed that 30 informants is enough to be able to produce statistically valid results, there is a limitation regarding the relatively low number of informants in this study (N=47). Even if recruiting more informants is unlikely to yield very different results in terms of Lean Startup and correlation to success, it would be likely to increase the significance of the results (Pedhazur & Schmelkin, 1991).

For practical reasons we chose to use a specific definition for the population of our study: Startups located in incubators in Norway working on technology products, preferably aimed at the consumer market (see chapter 3.2 on selection). This was necessary in order for us to be able to gather a sufficient amount of data within our timeframe, but it also means that we do not know the total size of the population. A consequence of this is that we cannot presume that our findings can be generalized to all startup companies. Given the necessary resources, it would be interesting to repeat our study with a larger and more representative sample.

Because the questionnaire was created from scratch, we believe that there is room for improvement. This could for example be done by analyzing the results of this study and further developing the questionnaire based on our results. Examples of questions that could benefit from an upgrade are the questions used to measure use of creation theory:

- 2q) *"It's possible to create new business opportunities by combining existing resources in new and innovative ways"*
- 2w) *"Opportunities are not discovered, they are created by the actions of entrepreneurs"*
- 2z) *"There are many possible business opportunities out there waiting to be discovered"*

In retrospect, after analyzing the results of the questionnaire we see that these questions are hard to disagree with. Additionally they are not telling much about how entrepreneurs or startup employees are acting in practice.

As mentioned earlier, the questionnaire was sent to companies, not just individuals in particular roles within the companies. Consequently, we had no control over who within each

company answered the survey. The role of the informant within each company could have quite a big impact on the data. For example, there is reason to believe that a CEO would answer differently than a PR assistant. Ideally, given more time and resources to track down informants, it would be better to choose informants with specific roles from each company in order to increase the probability that the answers reflect the actions of the company.

5.3 Implications

The results of this thesis have some implications for researchers and entrepreneurs, as well as institutions trying to educate entrepreneurs. These implications are presented in the following three subchapters.

5.3.1 Further research

As this study was conducted with a sample limited to Norwegian tech-startups located in incubators, it would be interesting to see if the results would be the same if the study was repeated with a broader selection of startups, for example including startups from other countries than Norway.

5.3.2 Entrepreneurs

We found no significant correlation between use of Lean Startup and entrepreneurial success, or between theoretical knowledge about entrepreneurship and entrepreneurial success. We did however find a strong and significant correlation between experience with entrepreneurship and entrepreneurial success. An implication of this is that entrepreneurs should focus on getting practical experience, rather than learning about entrepreneurship theories. This could be achieved in several ways, for example by simply starting a company, or by joining other entrepreneurs in their startups and getting experience in that way.

5.3.3 Policy

As entrepreneurship is a practical profession, and entrepreneurial success is directly correlated with practical experience, this implies that policy makers interested in stimulating entrepreneurship should prioritize programs that give would-be entrepreneurs practical experience. For example it could be a good idea to separate students with a clear ambition of becoming entrepreneurs from students with more academic interests into different educations, where the entrepreneurs focus on things like internships and starting up companies of their own, while the more theoretically inclined focus on academic theories of innovation and entrepreneurship.

Perhaps, in order to facilitate education of successful entrepreneurs, there should be a choice already in high school for people with a drive to become entrepreneurs. There could for example be a separate line of study equivalent to today's vocational education, with a focus on giving the students practical experience as entrepreneurs. An interesting finding in this regard is a study by Oosterbeek, Praag, and Ijsselstein (2010), which showed that students who attended courses on entrepreneurship became less interested in becoming entrepreneurs after the course than they were before. This might be an indication that the students' expectations toward entrepreneurship were overly optimistic, in which case learning about its realities at an earlier stage could be beneficial.

As we mentioned in chapter 1.1 on our motivation, Innovation Norway is currently encouraging Norwegian startups to use the Lean Startup framework. Our findings indicate that Innovation Norway, and the companies they support, could benefit from emphasizing entrepreneurship experience over teaching any particular entrepreneurship theory or framework.

When it comes to entrepreneurship, it seems like the proverb, "what doesn't kill you makes you stronger" holds true. It seems like aspiring entrepreneurs should be encouraged to learn by doing and even failing, as long as they strive to do so as quickly and cheaply as possible. Ironically, this idea of "failing fast" is one of the key points of Lean Startup. However, it is not a new idea. As we have shown, many of the theories we studied mention this in various ways. Therefore, this is not a reason to prefer Lean Startup to any other theory or framework.

As experience with entrepreneurship is such an important factor for entrepreneurial success, any government that wishes to stimulate entrepreneurships would be well advised to lower the barriers for starting a company and minimizing the risk for those who chose to do so. For example, one idea could be to provide scholarships for internships in startups, or providing better pension schemes for entrepreneurs even if their startup companies should fail.

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Appendix I: Questionnaire

A copy of the questions and the information in the questionnaire is found below.

1. Informed Consent

As with any research project, it's important that your decision to participate is made with informed consent. In other words, you agree to participate voluntarily, and you know what you're agreeing to:

- You agree to participate in this survey.
- You may withdraw from participating at any time, and you don't have to specify any reason.
- We will keep your answers and your identity confidential.
- Once the project is finished, all data you have contributed will be deleted.

[I Accept] , [I Don’t Accept]

2. Instructions

In the following section you will be presented with various statements related to entrepreneurship and to running a company. We would like to know if you agree or disagree with each statement.

When answering, try to consider what would suit you and your current start-up most of the time. If a statement doesn't apply to you, answer what you think would apply in general. Please feel free to leave a comment at the end of the survey if you would like to elaborate on any of your answers.

As a thank you for participating, we'd like to offer you the chance to receive the results of the survey once we've completed data gathering. You will have the option to sign up for this at the end of the survey.

[Continue]

All of the questions in this sections is answered on a 7 point Likert scale. 1 = Completely disagree, 4 = Neither agree nor disagree, 7 = Completely agree

2a) *"The network of the team members is more important for success than the quality of the product"*

2b) *"Before thinking about launching a startup it's important to consider the attractiveness of the market and industry"*

2c) *"In order to reach the biggest possible market in the long term, it's best to start with a small niche"*

2d) *"Getting feedback from customers should have higher priority than working on the product"*

2e) *"Most potential customers won't buy your product unless they have an alternative product to compare it to"*

2f) *"A business plan always needs to be changed once you start putting it into action"*

2g) *"The product is not the most important factor to consider when launching a startup"*

2h) *"It's more valuable to do experiments, than to keep your initial customers at all costs"*

2i) *"When launching a new product, you should make sure the product is as good as possible before you start selling it"*

2j) *"Good entrepreneurs are visionaries, and it's important to be able to stick with the plan even if the market hasn't responded yet"*

2k) *"I try to follow scientifically verified approaches to entrepreneurship"*

2l) *"Instead of doing market research, you should try to sell your product"*

2m) *"Working toward the original vision is more important than adapting to feedback from potential customers"*

2n) *"Identifying entrepreneurial opportunities requires creativity and imagination"*

2o) *"Before launching a new company, it's best to do a lot of research on the market situation"*

2p) *"Searching for new ways to use your resources should be a priority"*

2q) *"It's possible to create new business opportunities by combining existing resources in new and innovative ways"*

2r) *"Marketing should be a top priority of any start-up"*

2s) *"The best way to get feedback is to try to sell your product"*

2t) *"It's a good idea to spend time learning theoretical approaches to entrepreneurship"*

2u) *"Market research is more valuable than experiments with customers"*

2v) *"Only certain kinds of people are suited to be entrepreneurs"*

2w) *"Opportunities are not discovered, they are created by the actions of entrepreneurs"*

2x) *"The quality of the team is more important than the quality of the product"*

2y) *"Practical experience with entrepreneurship is more valuable than theoretical knowledge"*

2z) *"There are many possible business opportunities out there waiting to be discovered"*

2aa) *"When launching a new company, it's more valuable to build good connections with suppliers and producers than to gain customers early on"*

2ab) *"Theories are better suited for academic analysis than for real entrepreneurship"*

2ac) *"On average, people who start companies are fundamentally different from people who do not"*

3. Theories on entrepreneurship

In this section, you will be asked how familiar you are with various theories on entrepreneurship.

If you feel that there are certain important theories or frameworks that we haven't included, please feel free to let us know in your comment at the end of the survey.

All of the questions in this section is answered on a 7 point Likert scale. 1 = Not familiar at all, 7 = Very familiar.

3a) Effectuation / Causation

3b) Discovery / Creation

3c) Bricolage

3d) Crossing the chasm

3e) Technology Ventures

3f) The New Business Road Test (NBRT) / Mullins seven domains model

3g) Customer Development / The Four Steps to the Epiphany

3h) Lean Startup

4. Company Information

You have now finished the bulk of the survey. Thank you!

Next, we will ask you for some basic information regarding your company and yourself.

4a) What's the name of your company?

[Insert name here: [Textbox]]

4b) How long has it been since your company was formally founded? (By founded, we mean registered in Foretaksregisteret or similar.)

[Less than a year], [1 - 2 years], [2 - 4 years], [More than five years], [I don't know]

4c) What incubator are you located at?

[List of incubators] [Other [Textbox]] Single choice

4d) What kind of industry are you operating in?

[List of industries] [Other [Textbox]] Multiple choice

4e) What kind of customers is your company targeting? (Choose as many as you like)

[Consumers], [Businesses], [Government Institutions], [Other [Textbox]] Multiple choice

4f) How many different products has your company launched? (By launched, we mean products that have been made available to the market.)

[Zero], [1], [2 - 5], [6 - 10], [More than 10] Single choice

If answer == Zero, jump to 4h;

4g) How long has it been since your company launched its first product?

[Less than a year], [1 - 2 years], [3 - 5 years], [More than five years] Single choice

4h) How is your company’s current cash flow?

[Negative], [Roughly break even], [Positive], [I don’t know], [I choose to withhold this information]

If answer is NOT “positive”, jump to 4j

4i) For how long have you had a positive cash flow?

[Less than a year], [1 - 2 years], [3 - 5 years], [More than five years] Single choice

4j) Has your company received any form of funding?

[Yes], [No], [I choose to withhold this information] Single choice

If answer is NOT “Yes”, jump to 4m

4k) Where have you received funding from? (If you don't want to share this information, you may leave the question blank. Choose as many as you like)

[Professional investors], [Government agencies], [Friends, family or other acquaintances], [Founders, employees, team members], [Other[Textbox]] Multiple choice

4l) How much was your company valued at?

[My company has not been formally valuated], [Less than 1M NOK], [1M NOK - 10M NOK], [10M NOK - 100M NOK], [100M NOK - 500M NOK], [More than 500M NOK], [I choose to withhold this information] Single choice

4m) What was your company's revenue last year?

[Less than 100K NOK], [100K NOK - 500K NOK], [500K NOK - 2M NOK], [2M NOK - 5M NOK], [5M NOK - 50M NOK], [More than 50M NOK], [I choose to withhold this information] Single choice

4n) Roughly how many customers did you have last year? (You may include both paying and nonpaying customers in your answer.)

[None], [1-10], [10 - 100], [100 - 1'000], [1'000 - 10'000], [10'000 - 100'000], [100'000 - 1'000'000], [More than a million], [I choose to withhold this information] Single choice

5. Personal Information

All that remains is some basic information about you.

Thanks in advance, and remember - you're doing it for science!

5a) What are your areas of responsibility in [Company name]? (Choose as many as you like)

[Management], [Technical], [Customer support], [Sales], [Marketing], [Other[Textbox]] Multiple choice

5b) How old are you?

[Below 20], [21-25], [26-30], [31-35], [36-40], [41-45], [46-50], [Older than 50] Single choice

5c) What's your gender?

[Male], [Female] Single choice

5d) What's your highest completed level of education?

[High School], [Some higher education], [Bachelor], [Master], [PhD] Single choice

If answer is "High School", jump to 5f

5e) What's your field of education?

[IT], [Entrepreneurship], [Business], [Economics], [Marketing], [Natural science / Engineering], [Social Science] [Other[Textbox]] Single choice

5f) How many companies have you started?

[0], [1], [2], [3], [4], [5 or more] Single choice

5g) For how many years have you been working as an entrepreneur or in a startup?

[None], [1 year or less], [2 years], [3 years], [4 years], [5 years or more] Single choice

6. Email

6a) Would you like to get the results of this survey by email?

As a thank you, we would like to offer you the opportunity to receive the results of this survey once we've finished data gathering.

If this sounds interesting to you, please enter your email address below:

[Textbox]

Appendix II: Variables

This appendix lays out the composition of the composite variables that were calculated based on multiple answers from the survey. The average score for each composite variable was calculated by summarizing the score from each applicable question and dividing by the number of questions. Some questions represent negative responses toward the variable in question, in which case the score was subtracted from the total rather than added to it. Since the score on each question ranged from -3 to +3, the calculations were straight forward.

The variables were calculated in the following way:

- Lean Startup: (2d + 2f + 2h - 2i - 2j + 2l - 2m + 2s - 2u - 2ac) / 10
- Seven domains (NBRT): (2a + 2b - 2f + 2g + 2o + 2u + 2x + 2aa) / 8
- Crossing the Chasm: (2c + 2e + 2i - 2l + 2r) / 5
- Creation: (2q + 2w - 2z) / 3
- Discovery: (-2q + 2v - 2w + 2z + 2ac) / 5
- Bricolage: (2n + 2o) / 2
- Attitude toward theoretical Entrepreneurship: (2t + 2y - 2ab) / 3

Variable	Questions
Lean Startup	2d) "Getting feedback from customers should have higher priority than working on the product" 2f) "A business plan always needs to be changed once you start putting it into action" 2h) "It's more valuable to do experiments, than to keep your initial customers at all costs" 2i) "When launching a new product, you should make sure the product is as good as possible before you start selling it" (subtracted) 2j) "Good entrepreneurs are visionaries, and it's important to be able to stick with the plan even if the market hasn't responded yet" (subtracted) 2l) "Instead of doing market research, you should try to sell your product"

Variable	Questions
	2m) "Working toward the original vision is more important than adapting to feedback from potential customers" (subtracted) 2s) "The best way to get feedback is to try to sell your product" 2u) "Market research is more valuable than experiments with customers" (subtracted) 2ac) "On average, people who start companies are fundamentally different from people who do not" (subtracted)
New Business Road Test (NBRT)	2a) "The network of the team members is more important for success than the quality of the product" 2b) "Before thinking about launching a startup it's important to consider the attractiveness of the market and industry" 2f) "A business plan always needs to be changed once you start putting it into action" (subtracted) 2g) "The product is not the most important factor to consider when launching a startup" 2o) "Before launching a new company, it's best to do a lot of research on the market situation" 2u) "Market research is more valuable than experiments with customers" 2x) "The quality of the team is more important than the quality of the product" 2aa) "When launching a new company, it's more valuable to build good connections with suppliers and producers than to gain customers early on"
Crossing the Chasm	2c) "In order to reach the biggest possible market in the long term, it’s best to start with a small niche" 2e) "Most potential customers won’t buy your product unless they have an alternative product to compare it to" 2i) "When launching a new product, you should make sure the product is as good as possible before you start selling it" 2l) "Instead of doing market research, you should try to sell your

Variable	Questions
	product" (subtracted) 2r) "Marketing should be a top priority of any start-up"
Creation theory	2q) "It's possible to create new business opportunities by combining existing resources in new and innovative ways" 2w) "Opportunities are not discovered, they are created by the actions of entrepreneurs" 2z) "There are many possible business opportunities out there waiting to be discovered" (subtracted)
Discovery theory	2q) "It's possible to create new business opportunities by combining existing resources in new and innovative ways" (subtracted) 2v) "Only certain kinds of people are suited to be entrepreneurs" 2w) "Opportunities are not discovered, they are created by the actions of entrepreneurs" (subtracted) 2z) "There are many possible business opportunities out there waiting to be discovered" 2ac) "On average, people who start companies are fundamentally different from people who do not"
Bricolage	2n) "Identifying entrepreneurial opportunities requires creativity and imagination" 2p) "Searching for new ways to use your resources should be a priority"
Attitude toward entrepreneurship theory	2t) "It's a good idea to spend time learning theoretical approaches to entrepreneurship" 2y) "Theories are better suited for academic analysis than for real entrepreneurship" 2ab) "Theories are better suited for academic analysis than for real entrepreneurship"